

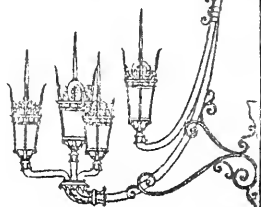
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ANALYSIS

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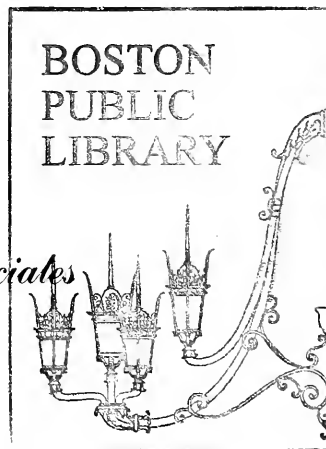
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KENMORE SQUARE PARKING GARAGE

Boston, Massachusetts

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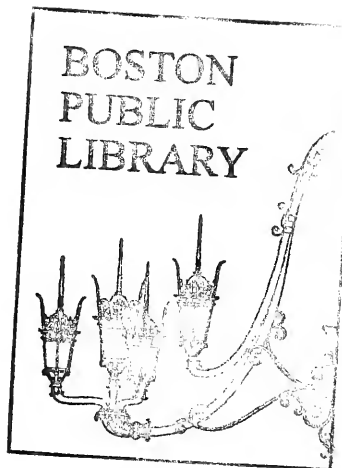


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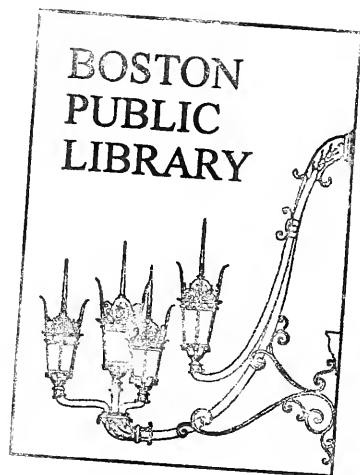
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Feasibility Analysis
PROPOSED PARKING GARAGE
Kenmore Square, Boston, Mass.

Prepared by



Wilbur Smith and Associates
Consulting Engineers
New Haven, Connecticut

March, 1965

Wilbur Smith and Associates

Cable: Wilsmith

CONSULTING ENGINEERS

495 ORANGE STREET

New Haven, Conn. 06504

March 31, 1965

Mr. Seymour W. Gage
Gage and Martinson
305 East 63rd Street
New York 21, New York

Dear Mr. Gage:

We are pleased to submit herewith our Feasibility Report concerning the proposed Kenmore Square parking garage in Boston, Massachusetts. The report covers, in detail, work authorized under Parts 1-C and 2-C of our agreement dated September 28, 1964.

Present parking and traffic conditions in the site's environs were thoroughly evaluated. Garage accessibility, internal circulation, and pedestrian facilities were also reviewed. Pertinent economic analyses were made of anticipated garage patronage, gross revenues, maintenance and operating expenses, total project costs, and debt-service coverage.

These studies indicate that there is a need for additional off-street parking spaces in Kenmore Square and that the proposed garage is well located to serve the motoring public with a minimum of land taking, due to its construction over the Massachusetts Turnpike Extension. Net operating income is estimated to provide a 1.15 coverage of level debt service, assuming total project costs of \$3,335,000, and a 19-year earning period for 20-year bonds with a 3.25 per cent interest rate. While debt-service deficits may be expected during the first two years of garage operations, these will be offset by higher earnings in later years.

We wish to acknowledge the valuable assistance and cooperation of the Real Property Board of the City of Boston, as well as the Boston Redevelopment Authority, in the conduct of these studies. We have enjoyed being associated with you on this interesting project.

Respectfully submitted,

WILBUR SMITH AND ASSOCIATES


Paul E. Conrad

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Chapter 1

INTRODUCTION

In recent years, significant efforts have been made by various public agencies in Boston to provide adequate off-street parking. While recent and planned improvements in Boston's urban expressways and arterial streets will make it more convenient to drive into and within Boston than in the past, the City's ability to accommodate parked vehicles has not always kept pace with these highway improvements and continually increasing parking demands.

The many problems encountered in providing adequate off-street parking within a city as intensely developed as Boston include the impacts of large land takings by public bodies on property taxes. Within this context, the Real Property Board of the City of Boston is considering construction of a multi-level parking garage, to be built primarily on air rights over the Massachusetts Turnpike, in the vicinity of Kenmore Square. The feasibility of construction and financing the proposed garage on this site is the subject of this report.



Purpose and Scope of Study

The first phase of the study is an evaluation of present parking conditions within the immediate environs of the proposed garage site, and the site's accessibility. The second phase is essentially economic in nature, dealing with anticipated usage, revenues, operating expenses, and over-all financial feasibility of the proposed facility.

Parking and Traffic Conditions - Pertinent information on present traffic conditions and parking demands within the area to be served by the proposed garage was developed and analyzed. Inventories of existing curb and off-street parking supply within the area were conducted, including rate schedules and operational techniques at parking lots and garages. Peak weekday vehicle accumulations were determined for curb and off-street facilities.

Parking characteristics were developed from interviews at selected off-street facilities. These included origins, destinations, parking durations, walking distances, and trip purposes. Traffic-flow characteristics in the vicinity of the proposed garage were also obtained and evaluated.

Analyses of the foregoing data provided a basis for determining the size of the proposed garage and what access



facilities would be required or desirable.

The results of various parking and traffic surveys were briefly summarized in a preliminary report submitted on November 16, 1964, and are described in detail in this report.

Economic Feasibility - Economic feasibility of the proposed parking facility was developed by analyzing parking deficiencies and surpluses on a block-by-block basis throughout the study area for a typical weekday and giving consideration to the additional parking requirements of Fenway Park. Estimates were made of anticipated garage usage under various rate schedules and an optimum rate schedule developed for the proposed garage.

Gross parking revenues, operating expenses, and resulting net operating income were compared with debt-service requirements based upon estimated total project costs to determine over-all financial feasibility.

The results of these economic studies were submitted in a summary report dated February 17, 1965, and are covered in detail in this report.

Kenmore Square

Located approximately 2.5 miles west of Boston Harbor, just south of the Charles River which separates Boston from

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Cambridge, Massachusetts, is the junction of three major arterial streets, Commonwealth Avenue, Beacon Street, and Brookline Avenue. This junction is called Kenmore Square. Its location is shown in Figure 1, which also indicates other major streets and highways serving the City of Boston.

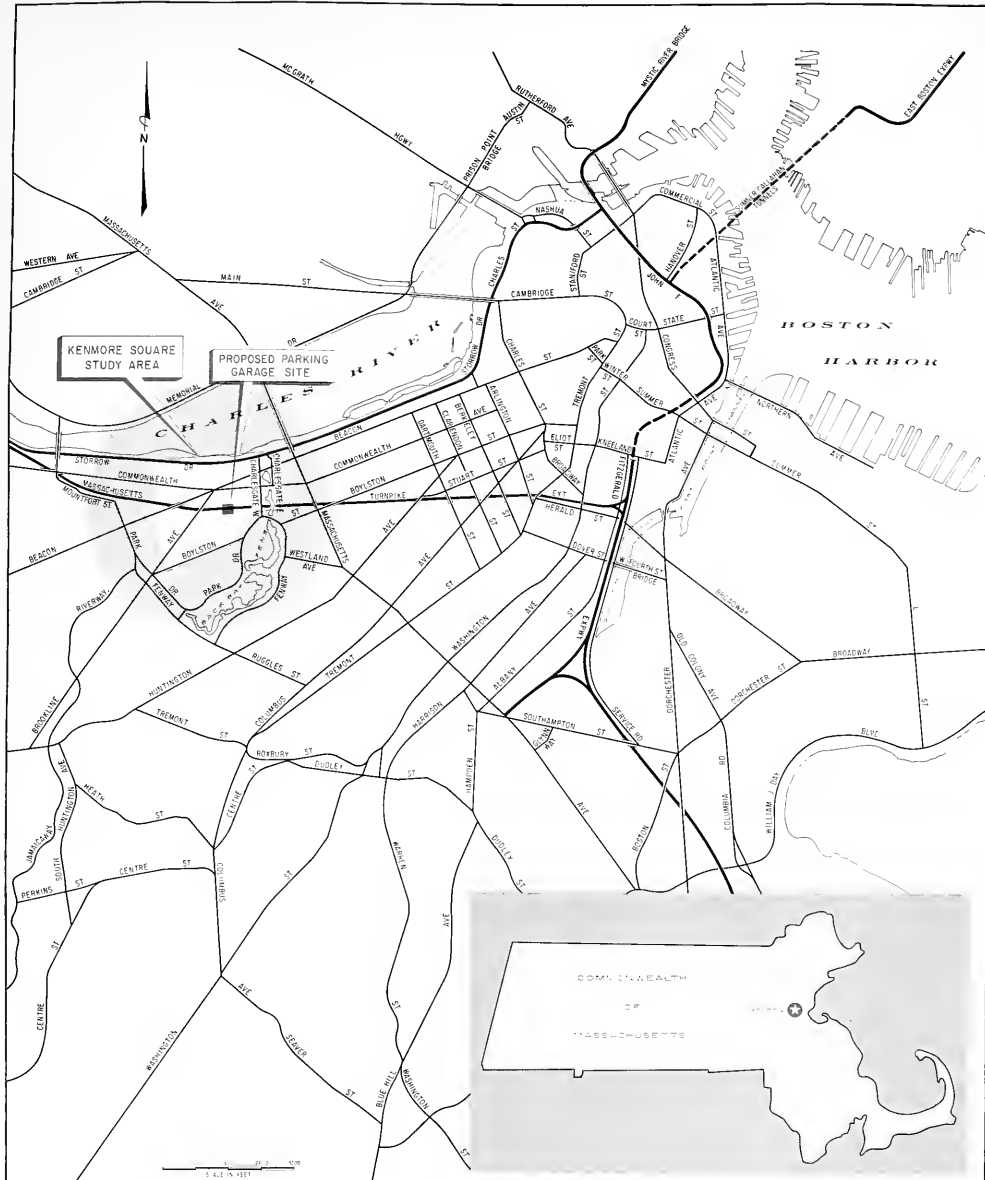
Bisecting the Kenmore Square area is the extension of the Massachusetts Turnpike, opened to traffic in mid-February, 1965, and the New York Central Railroad. Nearby is Fenway Park, home of the Boston Red Sox baseball team, and the Patriots', Boston's professional football team.

It is an area of mixed land uses, predominately industrial-commercial, with some residential uses concentrated in its northernmost portion. Mixed industrial-commercial-residential uses are found in the area's southern portion. (1)

The Study Area

The anticipated limits of the proposed garage's influence area were carefully defined, based upon detailed field reconnaissance, and are indicated in Figure 2. In general, these limits extend about 1,000 feet from the site of the proposed garage, with certain exceptions such as the Fens,

(1) Parker Hill-Fenway General Neighborhood Renewal Plan R-48, Boston Redevelopment Authority, dated May 31, 1963.



LOCATION MAP





and include Fenway Park and adjacent city blocks. Thus, the study area includes the area between Storrow Drive on the north, to Boylston Street on the south, and from Charlesgate on the east, to a line on the west connecting Sherborn, Blandford, Beacon, Munson, Boylston, and Kilmarnock Streets, and Burlington Avenue.

The study area is "an established center for professional, business, and personal services, and has the potential to expand in these enterprises....." (2)

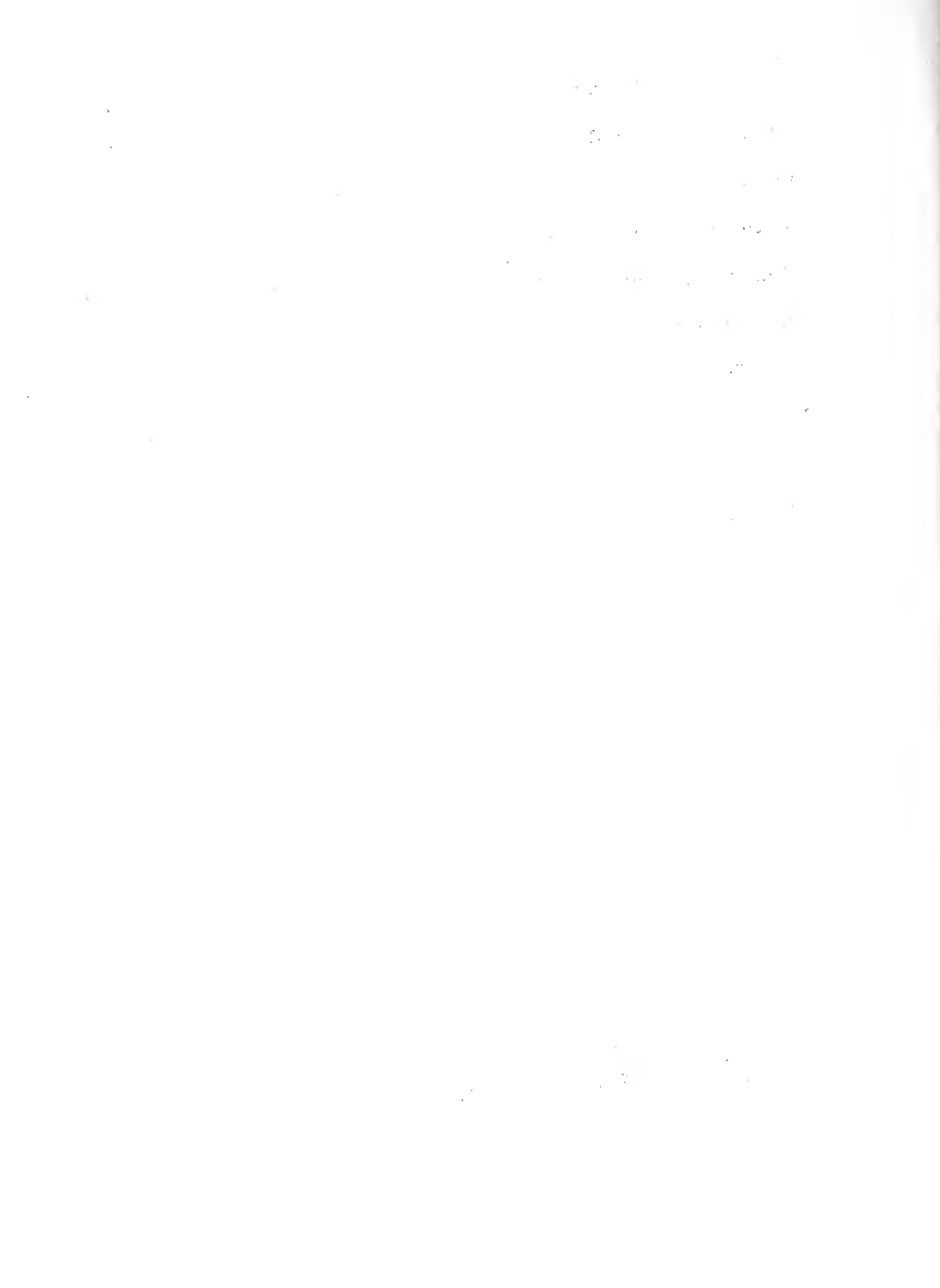
Site of the Proposed Garage

The location of the proposed parking facility, determined through numerous discussions between the architect-engineer and representatives of various Boston agencies, is also shown in Figure 2.

The garage site is located to the south of Commonwealth Avenue, west of Kenmore Street. It would extend southward from an alleyway south of Commonwealth Avenue, across the Massachusetts Turnpike and the New York Central Railroad, to Lansdowne Street.

In general, the proposed garage would be constructed on air rights over the Massachusetts Turnpike and the New York

(2) Regional Core Sketch Plan II: Proposals, Boston Redevelopment Authority, dated January 9, 1963.



Central Railroad. Actual property acquisition could be limited to two relatively small parcels.

It would be necessary to acquire a land parcel containing two surface parking lots on the north side of Newbury Street. This parcel is about 345 feet wide, east to west, and extends from Newbury Street to an alleyway about 65 feet to the north (the line varies from about 70 feet in depth on the east, to about 62 feet on the west).

It would also be necessary to acquire a land parcel on the north side of Lansdowne Street. This parcel is about 190 feet wide (east to west) and extends northward from Lansdowne Street about 130 feet to the New York Central right-of-way. It contains a vacant building, formerly used as an ice plant, and a railroad industrial side track.

The proposed garage would be approximately 110 to 125 feet wide and located over the Massachusetts Turnpike. The entire site including ramps and approaches, would affect a land area approximately 350 feet east to west, and about 375 feet north to south, with certain exceptions.



Chapter 2

PRESENT PARKING CONDITIONS

A thorough understanding of existing parking conditions within the environs of the garage site is essential in determining the need, desirable size, and likely earnings of the proposed facility. To quantify present parking conditions within the study area, a series of field surveys were conducted during October, 1964.

Complete inventories were made of curb and off-street parking, including vehicle accumulation. Interview surveys were conducted at selected off-street parking facilities, to measure pertinent parker characteristics. Parking deficiencies or surpluses were developed on a block-by-block basis throughout the study area, and recent attendance figures for ball games at Fenway Park were obtained and evaluated. A detailed description of these studies follows.

Parking Space Inventories

The extent of available parking within the study area was developed by field inventories. For each study-area block, off-street and curb spaces were recorded. Off-street

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the fifth is the fact that the
the sixth is the fact that the
the seventh is the fact that the
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the tenth is the fact that the

facilities were classified as to status, that is, commercial (public), customer, or private parking. Curb areas with parking restrictions, such as posted areas, loading zones, taxi stands, bus stops, etc., were carefully noted. The results of these inventories are summarized in Table 1.

Off-Street Parking Spaces - The 1,729 off-street parking spaces within the study area constitute over 69 per cent of all available, legal parking. The location of commercial, customer, and private off-street parking facilities are illustrated in Figure 3.

In that portion of the study area north of the Massachusetts Turnpike Extension, off-street facilities account for almost 62 per cent of all available, legal parking. Within this sector, over half of all off-street parking are commercial spaces -- 373 out of 717, while another third -- 244 spaces -- are private. Customer parking of 100 spaces make up the remainder.

It is significant to note that only four of the 11 study-area blocks north of the Turnpike contain off-street parking at present. These lots range in size from 12 to 175 spaces, the largest being private parking.

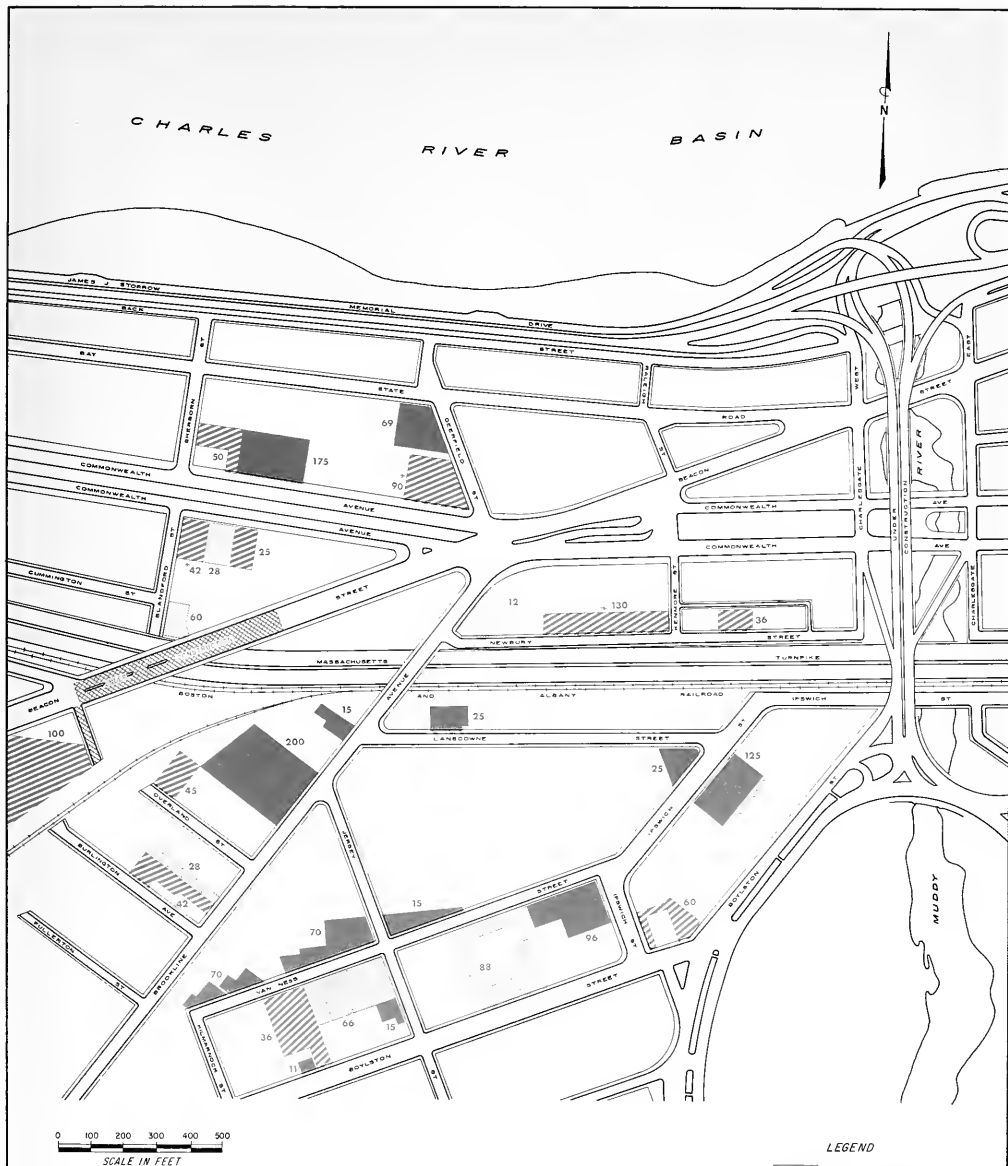
Table 1

PARKING SPACE INVENTORY

BLOCK NUMBER (1)	OFF-STREET PARKING SPACES				LEGAL CURB	TOTAL
	Commercial	Customer	Private	Subtotal	SPACES (off-peak)	SPACES
<u>North of Massachusetts Turnpike Extension</u>						
1	--	--	--	--	39	39
2	--	--	--	--	48	48
3	--	--	--	--	25	25
4	140	--	244	384	57	441
5	--	--	--	--	74	74
6	--	--	--	--	31	31
7	--	--	--	--	31	31
8	67	88	--	155	42	197
9	--	--	--	--	12	12
10	130	12	--	142	52	194
11	36	--	--	36	34	70
Subtotal	373	100	244	717	445	1,162
<u>South of Massachusetts Turnpike Extension</u>						
12	100	--	--	100	17 ⁽²⁾	117
13	87	33	207	327	20	347
14	--	--	25	25	31	56
15	--	--	140	140	59	199
16	--	--	40	40	29	69
17	60	--	8	68	90	158
18	36	45	47	128	32	160
19	--	118	66	184	48	232
Subtotal	283	196	533	1,012	326	1,338
TOTAL	656	296	777	1,729	771	2,500
PER CENT DISTRIBUTION:						
North of TPK	32.1	8.6	21.0	61.7	38.3	100.0
South of TPK	21.2	14.6	39.8	75.6	24.4	100.0
TOTAL	26.2	11.8	31.1	69.1	30.9	100.0

(1) See Figure 2.

(2) Estimated due to construction activities.



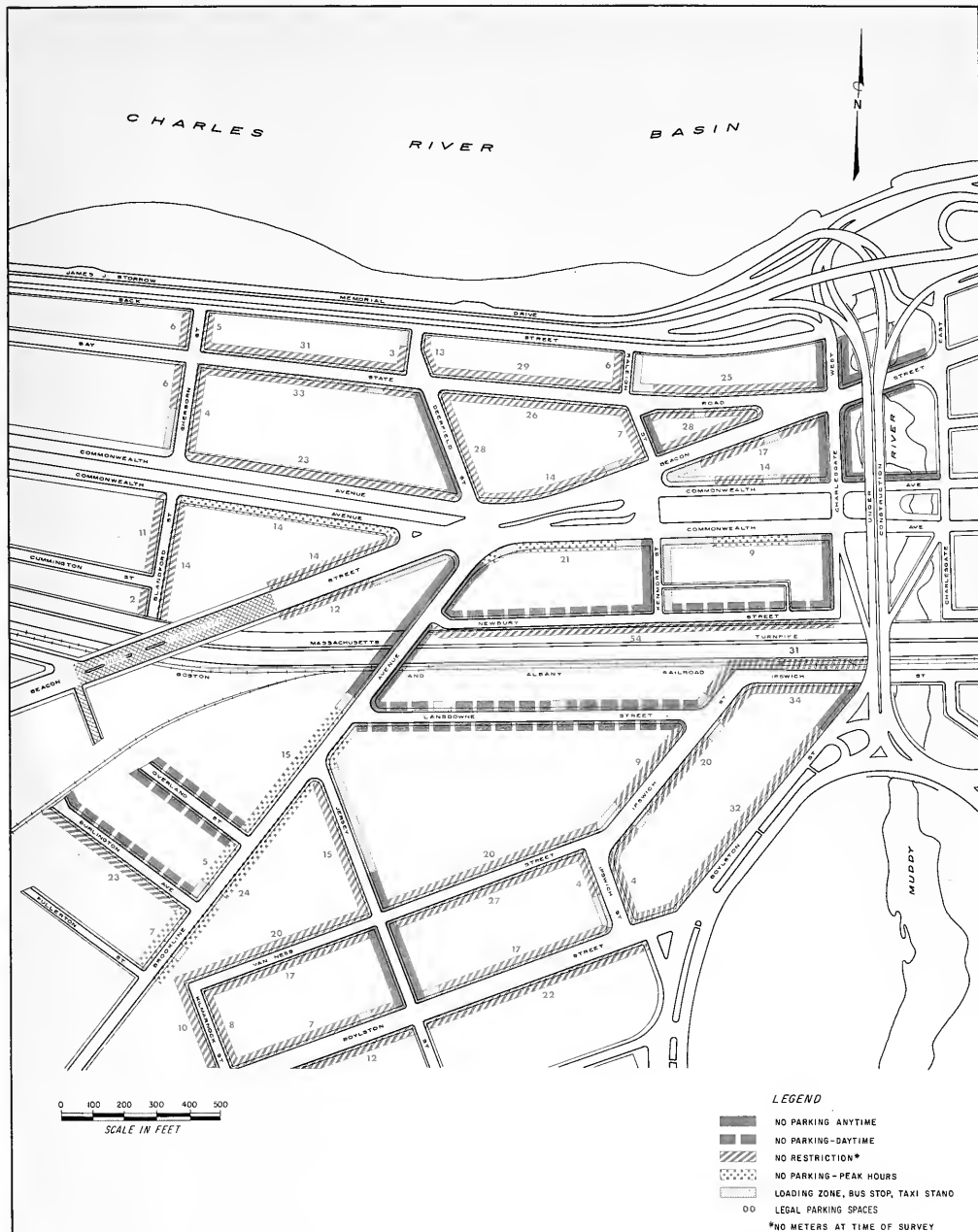
OFF-STREET PARKING FACILITIES



South of the Turnpike, off-street facilities account for over 75 per cent of all available, legal parking. Within this sector, over half of off-street spaces are private, 533 out of 1,012, while commercial facilities with 283 spaces are next in importance. The dominant position of private, off-street parking south of the Turnpike is largely due to surface lots owned or controlled by Fenway Park which, while used commercially during evening and weekend ball games, are leased to various industries for weekday, daytime employee parking.

Curb Parking Spaces - There are 771 legal curb parking spaces within the study area during off-peak hours. Of these, 100 spaces bear peak-hour no-parking restrictions, generally from 8:00 to 10:00 A.M., and/or from 4:00 to 6:00 P.M. The distribution of legal off-peak curb parking is illustrated in Figure 4.

Over-all, curb parking constitutes about 31 per cent of total parking spaces within the study area, although the proportion of curb to total spaces ranges from over 38 per cent for the area north of the Massachusetts Turnpike to about 24 per cent for the area south thereof.



CURB PARKING INVENTORY



Virtually all available legal curb spaces were metered, with time restrictions varying from 15 minutes to two hours, prior to December, 1963, when use of meters was discontinued, pending installation of new, vandal-proof equipment. This situation has made enforcement of time restrictions impractical. Purchase of new meters has recently been authorized and installation is expected to be completed by about mid-1965.

Peak Vehicle Accumulation

Concurrent with parking space inventories, field surveys were made to determine peak vehicle accumulations within the study area during daytime hours (10:00 A.M. to 6:00 P.M.) of a typical weekday, separately for curb and off-street parking. Curb parking accumulation was further separated between legal and other curb usage. The results of the vehicle-accumulation surveys are summarized in Table 2.

Curb Usage - About 40 per cent of the study area's peak vehicle accumulation is accommodated at curb spaces -- over 1,200 vehicles. All 771 legal curb spaces are used and an additional 458 vehicles utilize other curb space, or double park.

Table 2

PEAK VEHICLE ACCUMULATION
Typical Weekday

BLOCK NUMBER ⁽¹⁾	NUMBER OF PARKERS					PER CENT OF
	Curb			Off-		AVAILABLE
	Legal	Other	Subtotal	Street	Total	SPACES ⁽²⁾
<u>North of Massachusetts Turnpike Extension</u>						
1	39	7	46	-	46	118
2	48	8	56	-	56	117
3	25	8	33	-	33	132
4	57	30	87	374	461	105
5	74	23	97	-	97	131
6	31	9	40	-	40	129
7	31	19	50	-	50	161
8	42	13	55	184	239	121
9	12	24	36	-	36	300
10	52	41	93	133	226	116
11	34	42	76	40	116	166
Subtotal	<u>445</u>	<u>224</u>	<u>669</u>	<u>731</u>	<u>1,400</u>	<u>120</u>

South of Massachusetts Turnpike Extension

12 ⁽³⁾	17	12	29	95	124	106
13	20	52	72	330	402	116
14	31	36	67	25	92	164
15	59	14	73	145	218	110
16	29	66	95	60	155	225
17	90	21	111	108	219	139
18	32	13	45	147	192	120
19	48	20	68	184	252	109
Subtotal	<u>326</u>	<u>234</u>	<u>560</u>	<u>1,094</u>	<u>1,654</u>	<u>124</u>
TOTAL	<u>771</u>	<u>458</u>	<u>1,229</u>	<u>1,825</u>	<u>3,054</u>	<u>122</u>

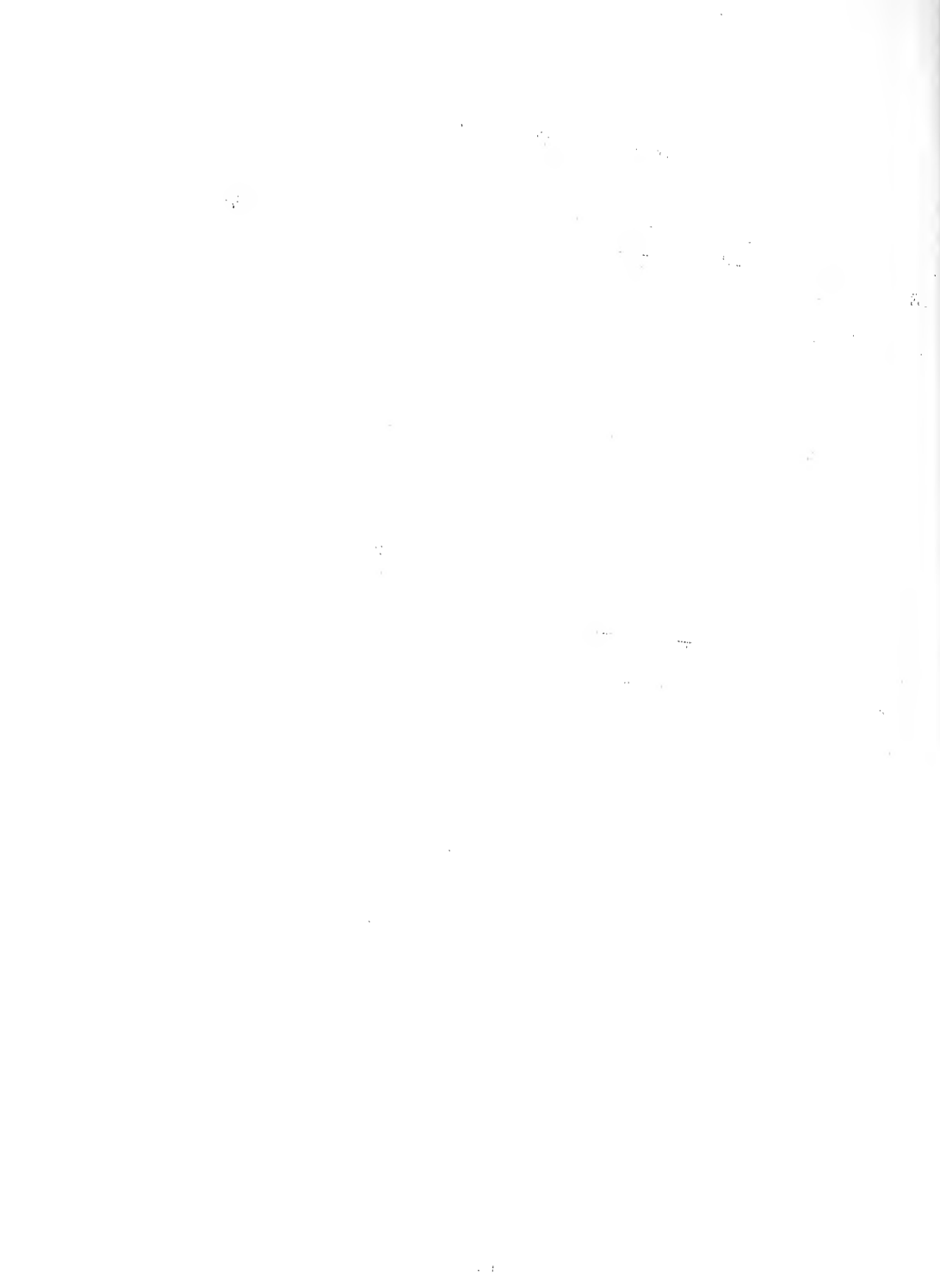
PER CENT DISTRIBUTION:

N. of TPK.	31.8	16.0	47.8	52.2	100.0
S. of TPK.	19.7	14.1	33.8	66.2	100.0
TOTAL	<u>25.2</u>	<u>15.0</u>	<u>40.2</u>	<u>59.8</u>	<u>100.0</u>

(1) See Figure 2

(2) See Table 1 for legal spaces in each block.

(3) Estimated account construction.



North of the Massachusetts Turnpike, curb usage accounts for almost 48 per cent of peak vehicle accumulation, compared with about 34 per cent south of the Turnpike.

Off-Street Facilities - Almost 60 per cent of the study area's peak vehicle accumulation is handled at off-street parking facilities. Peak vehicle accumulation in excess of available off-street spaces is due to intense use of aisle space through attendant parking at a few parking facilities. Thus, 1,825 vehicles were accommodated in 1,729 off-street parking spaces.

An Overview - As indicated in Table 2, peak vehicle accumulation exceeds the number of available, legal spaces in each of the 19 blocks within the study area, from five to 200 per cent. Over-all, peak accumulation is 22 per cent greater than available, legal spaces. It is significant to note that this simple comparison produces an immediately apparent deficiency of over 500 parking spaces within the study area, most of which is currently being accommodated in other-than-legal curb space.

The temporary absence of parking meters in the Kenmore Square area most likely contributes long-term, or "all-day"

parking. Restoration of metered time restrictions is expected to cause a significant shift of such parking to off-street facilities within the area.

Parking Charges

There are 12 commercial off-street parking facilities within the study area. Present parking rates were obtained in the course of various field surveys and have been summarized in Table 3. All 12 commercial facilities have "all-day" rates, ranging from \$1.00 to \$2.00, with an average daily charge of \$1.35. Several have short-term parking rates, based upon the number of hours parked, while some have weekly and monthly rates as well.

Parking charges for the first hour range from \$0.50 to \$0.75 and average \$0.55. For two hours of parking, the average charge is \$0.65 and, for three hours, \$1.10. The charge for "all-night" parking is somewhat lower than all-day rates, ranging from \$0.75 to \$1.50 and averaging \$1.20.

Weekly rates are available at three commercial facilities, from \$2.00 to \$5.00 per week, averaging \$3.35. Monthly rates average \$14.25, ranging from \$8.00 to \$20.00 at six facilities.

Table 3

COMMERCIAL PARKING RATES

<u>PERIOD</u>	<u>NUMBER OF FACILITIES</u>	<u>PARKING RATE</u>	<u>AVERAGE</u>
One Hour	6	\$0.50	\$0.55
	1	0.65	
	1	0.75	
Two Hours	1	0.50	0.65
	4	0.75	
	2	1.00	
Three Hours	5	1.00	1.10
	1	1.25	
	1	1.35	
All Day	5	1.00	1.35
	6	1.50	
	1	2.00	
All Night	1	0.75	1.20
	3	1.00	
	4	1.50	
Weekly	1	2.00	3.35
	1	3.00	
	1	5.00	
Monthly	1	8.00	14.25
	1	12.50	
	3	15.00	
	1	20.00	

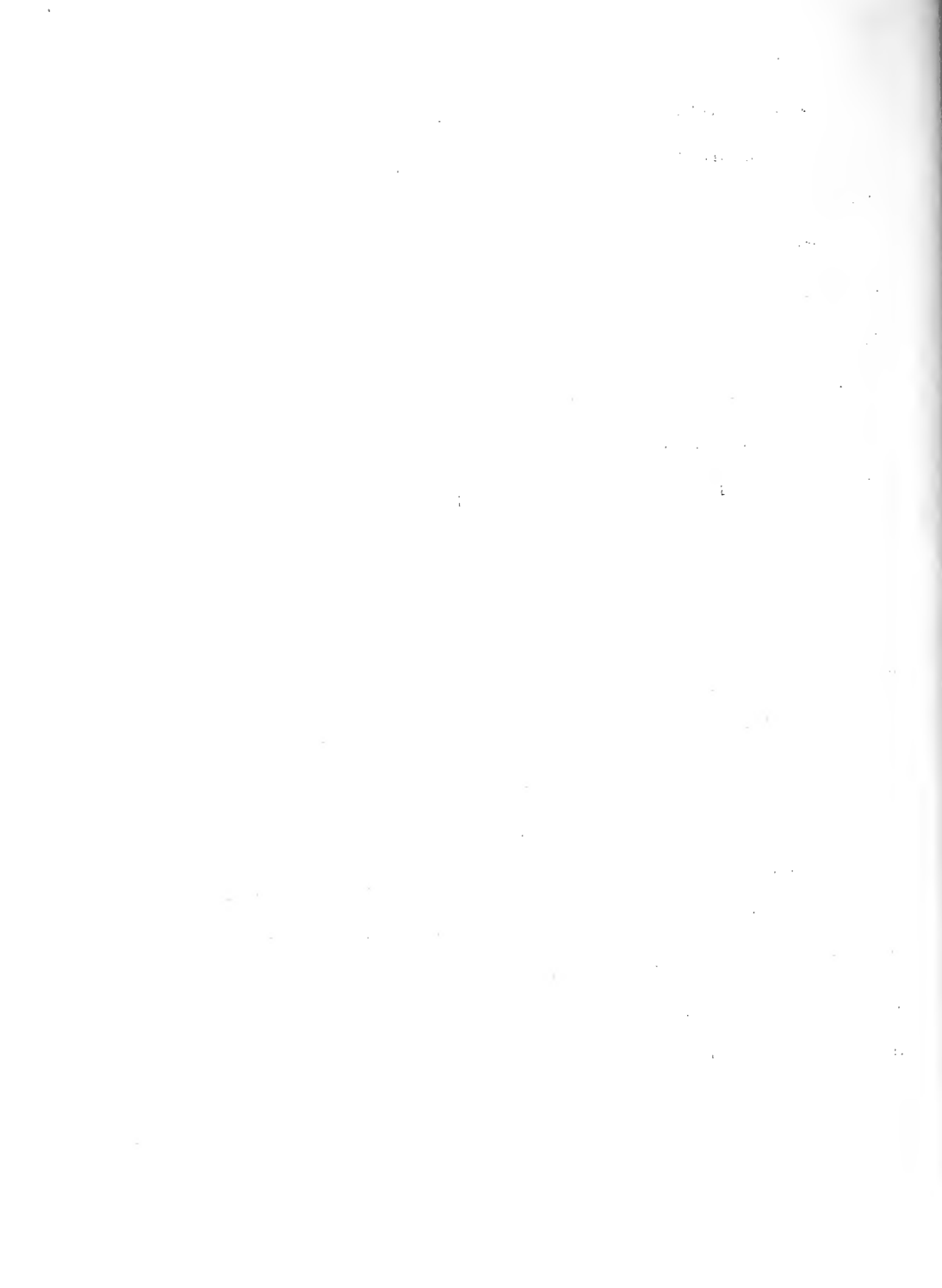


These parking charges are relative high for peripheral business areas like Kenmore Square. However, they are somewhat lower than parking rates in Downtown Boston.

The remaining off-street facilities consist of five customer facilities, 11 private facilities and three others for joint customer-private use. Generally, there is no charge for use of a customer-parking facility, the exception being occasional non-customer use intercepted by the facility operator. Only a few private facilities invoke parking charges from employees, normally at a relatively low monthly rate; most private parking is free for those qualified to use it.

Parking Characteristics

In order to develop pertinent characteristics of automobile drivers parking in the Kenmore Square area, a series of interview surveys were conducted at selected off-street facilities. Drivers were interviewed as they drove out of the parking lots being surveyed and their time of entering and leaving the facility recorded. Trained interviewers asked a series of questions designed to determine the primary purpose of the trip to Kenmore Square, as well as the



origin and study-area destination of the trip. From these data, parking durations and walking distances were developed, as well as origin and destination.

Selected Off-Street Facilities - Off-street parking facilities selected for interview surveys are designated in Figure 3. Commercial facilities were selected because private parking is primarily long-term (all-day) usage and free customer parkers would not be potential to the proposed parking garage.

The following is a brief description of the three parking facilities at which interview surveys were conducted during October, 1964.

(a) The Kenmore Square Auto Park, located at the southwest corner of Deerfield Street and Commonwealth Avenue in study-area Block 4, is a gravel-surfaced parking lot with 90 spaces, open from 7:00 A.M. to 12:00 midnight. On a typical weekday, about 145 parkers utilize this facility, giving it a turnover ratio of 1.6 (total cars parked divided by available spaces). A large proportion of its users are all-day patrons paying on the basis of \$20.00 per month or \$5.00 per week. Short-term parking rates are \$0.65



for the first hour, and \$0.35 for each hour thereafter, with a daily maximum charge of \$2.00. All-night parking is \$1.00. Cars are parked by both patrons and attendants.

(b) The Commonwealth Parking Lot, located at the south-east corner of Sherborn Street and Commonwealth Avenue in study-area Block 8, is a paved parking lot with 42 spaces, normally open from 8:00 A.M. to 5:00 P.M. On a typical week-day, about 90 parkers patronize this facility, producing a turn-over ratio of 2.1. Parking charges are \$0.50 for the first hour, and \$0.25 for each hour thereafter, with a daily maximum charge of \$1.50. No weekly or monthly rates are available. Free parking, or a discount to a flat \$0.25, is available to customers of certain adjacent businesses.

(c) The Newbury Street Parking Lots, located just west of Kenmore Street in study-area Block 10, are at the site of the proposed parking garage -- hence the data obtained at this location are particularly significant. Two distinct, separately owned, paved lots are involved but, for practical reasons, both are considered together. These lots have a total of 130 spaces and handle about 195 automobiles on a typical weekday, with a turnover ratio of 1.5. Charges range



to \$0.50 for the first half-hour, with a daily maximum of \$1.50. Weekly or monthly rates are not available. All cars are parked by attendants.

Trip Purpose - Distribution by trip purpose of the patrons of interviewed off-street parking facilities is shown in Table 4. Work trips constitute the largest portion overall, about 37 per cent, followed by "Other." purposes -- 35 per cent. The latter category includes recreational trips, personal services, as well as a significantly large proportion of trips made for medical services to a concentration of doctors' offices located on Commonwealth Avenue.

Business trips are significantly high, 22 per cent, reflecting industrial-commercial land uses in the study area. Shopping trips constitute a relatively small proportion of all trips, about six per cent.

Variations of trip-purpose distribution among the three interviewed facilities are not considered particularly significant but merely reflect certain characteristics of individual operations. For example, shopping trips are a higher percentage at the Commonwealth Parking Lot, where customer-parking validation is provided.



Table 4

TRIP PURPOSES

<u>PARKING FACILITY</u>	<u>TRIP</u>		<u>PURPOSE</u>		<u>TOTAL</u>
	<u>Work</u>	<u>Shop</u>	<u>Business</u>	<u>Other</u> ⁽¹⁾	
<u>Number of Parkers:</u>					
Kenmore Square Auto Park	50	4	41	49	144
Commonwealth Parking Lot	17	15	14	41	87
Newbury Street Parking Lots	89	8	38	57	192
TOTAL	<u>156</u>	<u>27</u>	<u>93</u>	<u>147</u>	<u>423</u>

Per Cent Distribution:

Kenmore Square Auto Park	34.7	2.8	28.5	34.0	100.0
Commonwealth Parking Lot	19.5	17.3	16.1	47.1	100.0
Newbury Street Parking Lots	46.3	4.2	19.8	29.7	100.0
TOTAL	<u>36.9</u>	<u>6.4</u>	<u>22.0</u>	<u>34.7</u>	<u>100.0</u>

(1) Includes recreational trips, personal services, and medical trips.



Parking Durations - The relative length of stay of parkers at interviewed facilities is summarized in Table 5. Because of the high proportion of business and other (i.e., medical and other personal service) trips to the study area, over-all parking times are of intermediate duration, averaging a little over three hours. Slightly shorter durations at the Commonwealth Parking Lot are due to a higher proportion of shopper parking, with its inherently shorter length of stay.

Distribution of parker durations is illustrated in Figure 5. Over 50 per cent of all parkers stay two hours or less. About 70 per cent stay four hours or less.

Vehicle Accumulation Patterns - The pattern of vehicle accumulations at selected off-street parking facilities is illustrated in Figure 6, together with relative levels of entering and exiting vehicles.

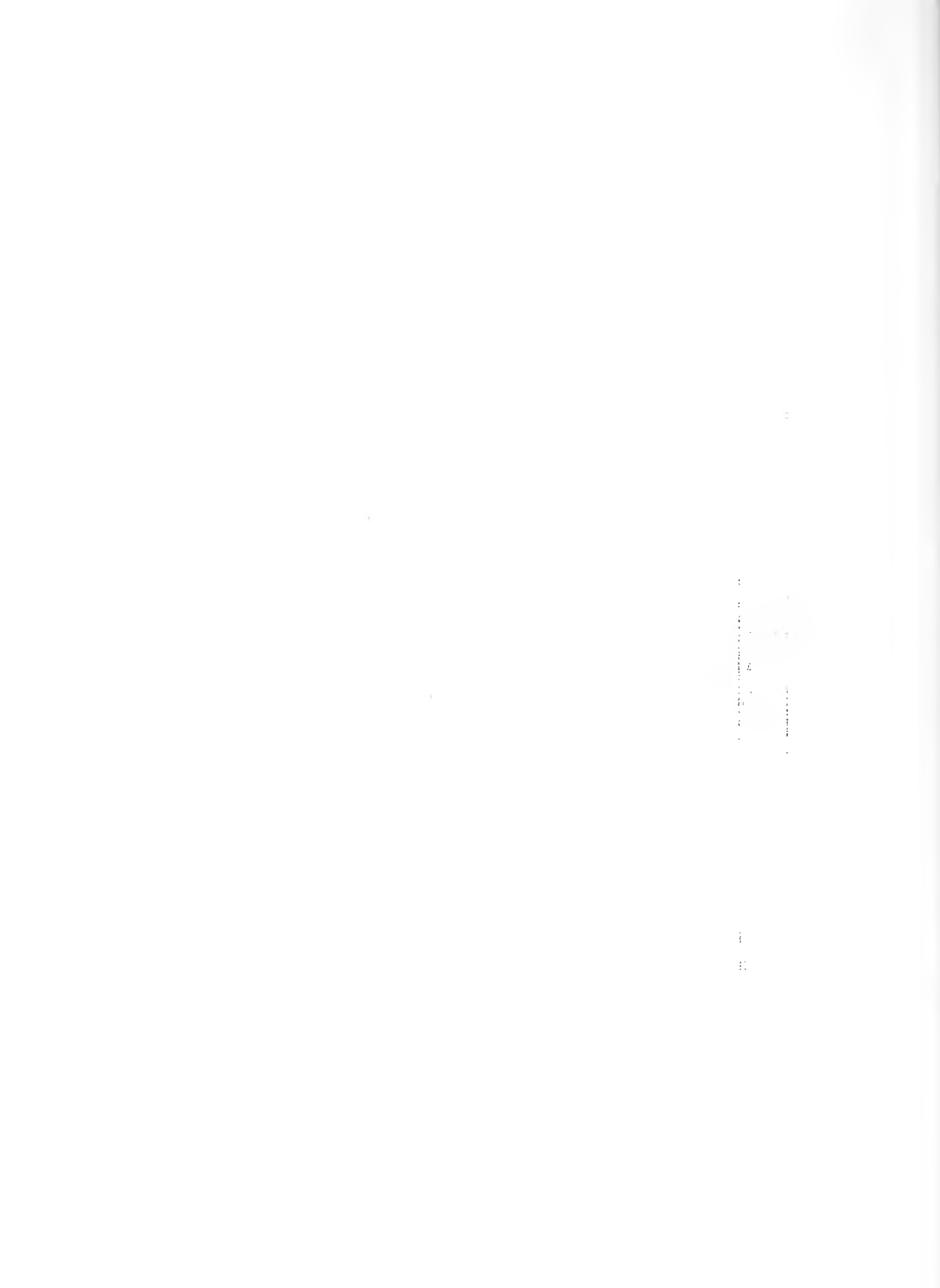
Over-all, peak accumulations occur between 1:00 and 3:00 P.M., but differ significantly between facilities. At the Kenmore Square Auto Park, and the Commonwealth Parking Lot, the period of peak accumulation occurs at 11:00 A.M., whereas it occurs at 3:00 P.M. at the Newbury Street Lots.

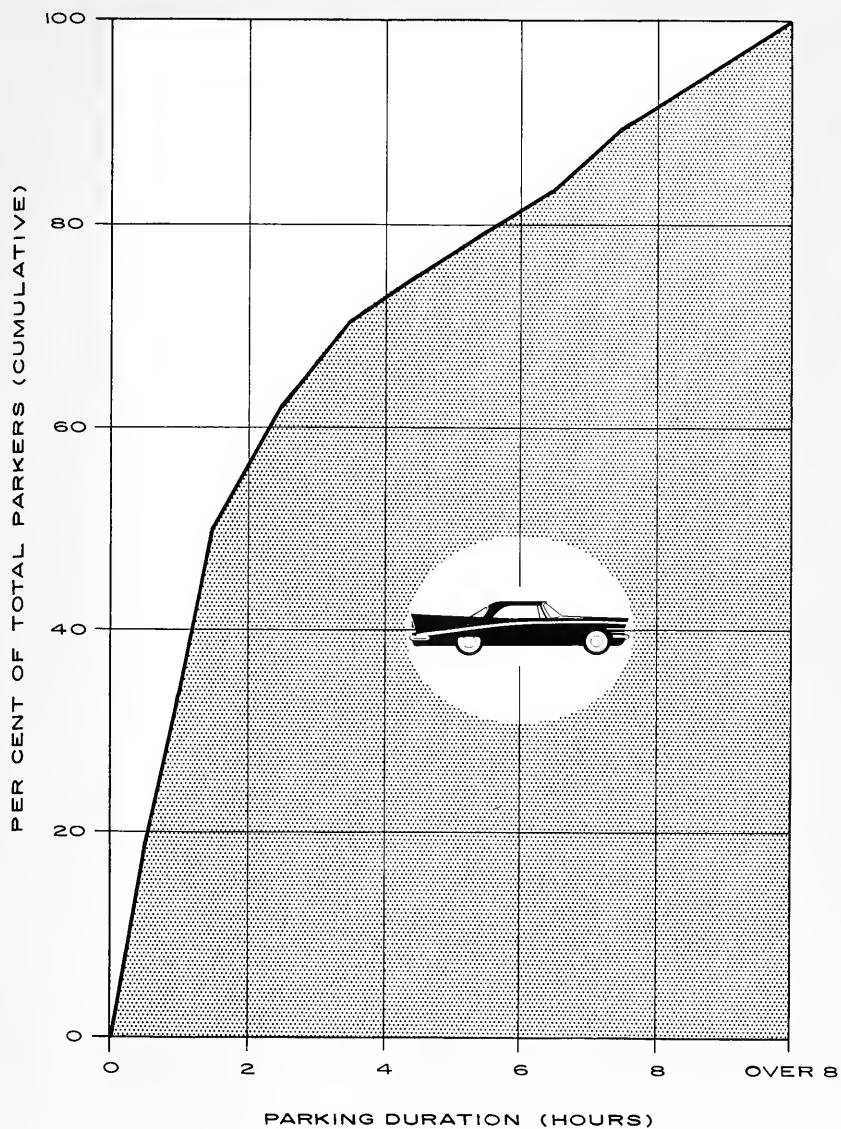


Table 5

AVERAGE PARKING DURATION

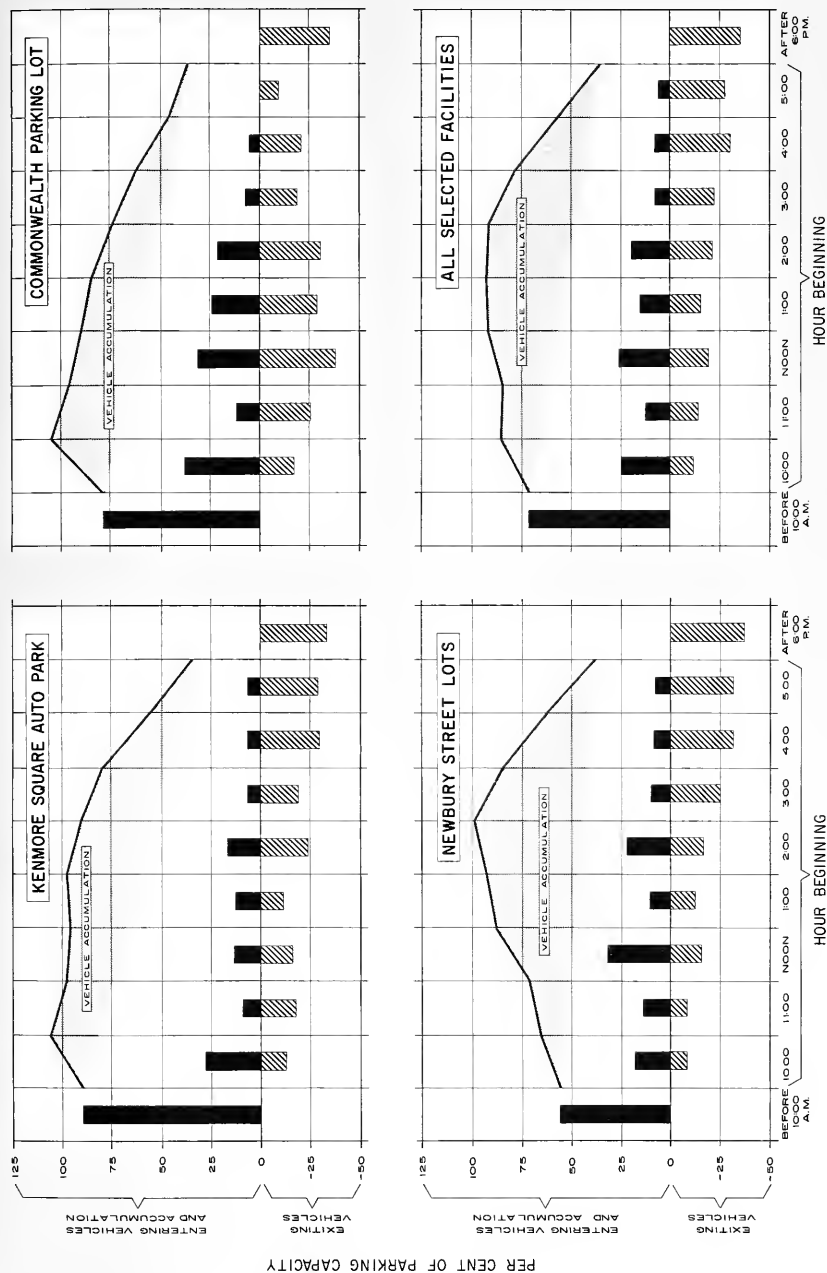
PARKING DURATION	NUMBER OF PARKERS			Total	PER CENT
	Kenmore Square Auto Park	Commonwealth Parking Lot	Newbury Street Parking Lots		
Less than 30 minutes	28	18	33	79	18.7
30 - 60 minutes	20	13	29	62	14.7
1 - 2 hours	27	15	30	72	17.0
2 - 3 hours	17	8	23	48	11.3
3 - 4 hours	7	9	21	37	8.7
Over 4 hours	45	24	56	125	29.6
TOTAL	<u>144</u>	<u>87</u>	<u>192</u>	<u>423</u>	<u>100.0</u>
AVERAGE (Hrs.Min.)	3:05	2:57	3:07	3:04	





PARKING DURATIONS
SELECTED OFF-STREET FACILITIES





**WEEKDAY VEHICLE ACCUMULATIONS
SELECTED OFF-STREET FACILITIES**



In each case, the largest proportion of vehicles enter before 10:00 A.M. At the Commonwealth Parking Lot, a peak exiting period occurs shortly after noon, while at the other two selected facilities, the largest proportion of vehicles departs after 5:00 P.M.

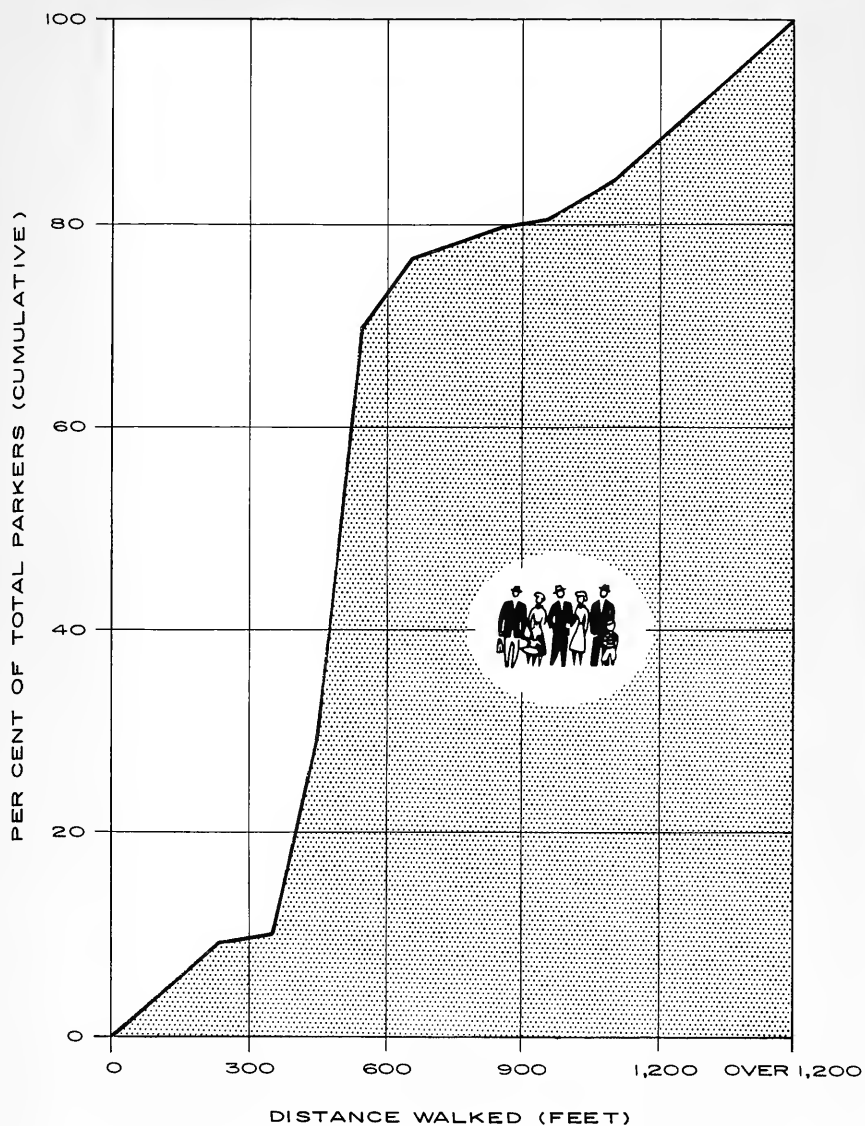
Walking Distances - Average walking distances between selected off-street facilities and study-area destinations are summarized in Table 6 and illustrated in Figure 7. About nine per cent of surveyed parkers walked less than 300 feet, while the over-all average walking distance was 681 feet. These distances are relatively long, and may be considered somewhat excessive for shopper and business parkers. Parkers using the Newbury Street Lots, at the site of the proposed garage, walked an average of 613 feet, due largely to circuitous pedestrian routes via Kenmore Street to Commonwealth Avenue.

Study-Area Destinations - Parker destinations at selected off-street facilities are listed in Table 7 and illustrated in Figure 8. Almost half of all surveyed parkers were destined to the block in which the parking facility is located, while about 40 per cent were destined to immediately-

Table 6

AVERAGE WALKING DISTANCE

WALKING DISTANCES (feet)	NUMBER OF PARKERS				PER CENT
	Kenmore Square Auto Park	Commonwealth Parking Lot	Newbury Street Parking Lots	Total	
Less than 300	--	39	--	39	9.2
300 - 500	80	--	4	84	19.9
500 - 700	20	--	181	201	47.5
700 - 900	7	2	4	13	3.1
900 - 1,200	19	--	--	19	4.5
Over 1,200	18	46	3	67	15.8
TOTAL	<u>144</u>	<u>37</u>	<u>192</u>	<u>423</u>	<u>100.0</u>
AVERAGE (feet)	658	370	613	681	



**AVERAGE WALKING DISTANCES
SELECTED OFF-STREET FACILITIES**

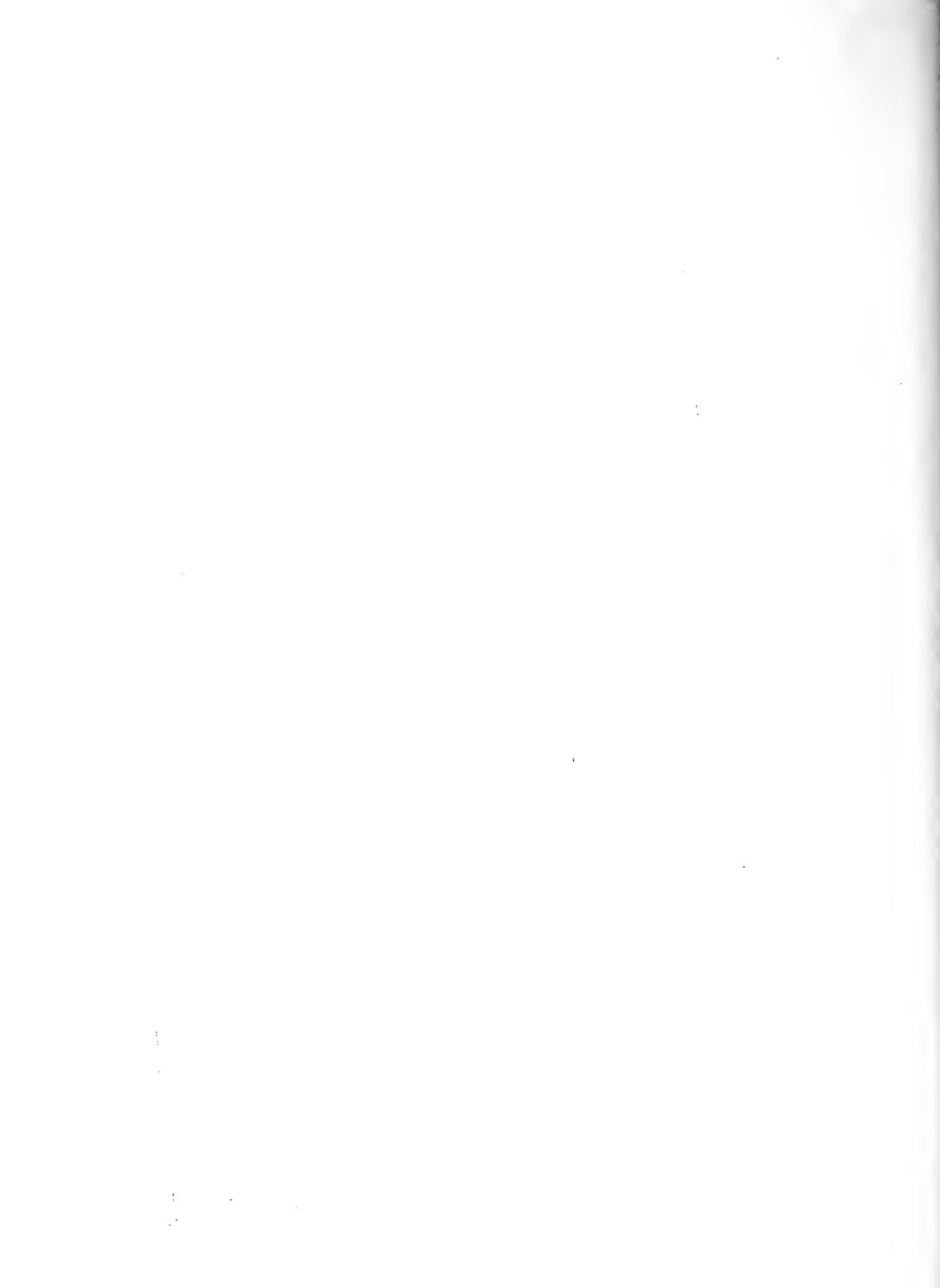


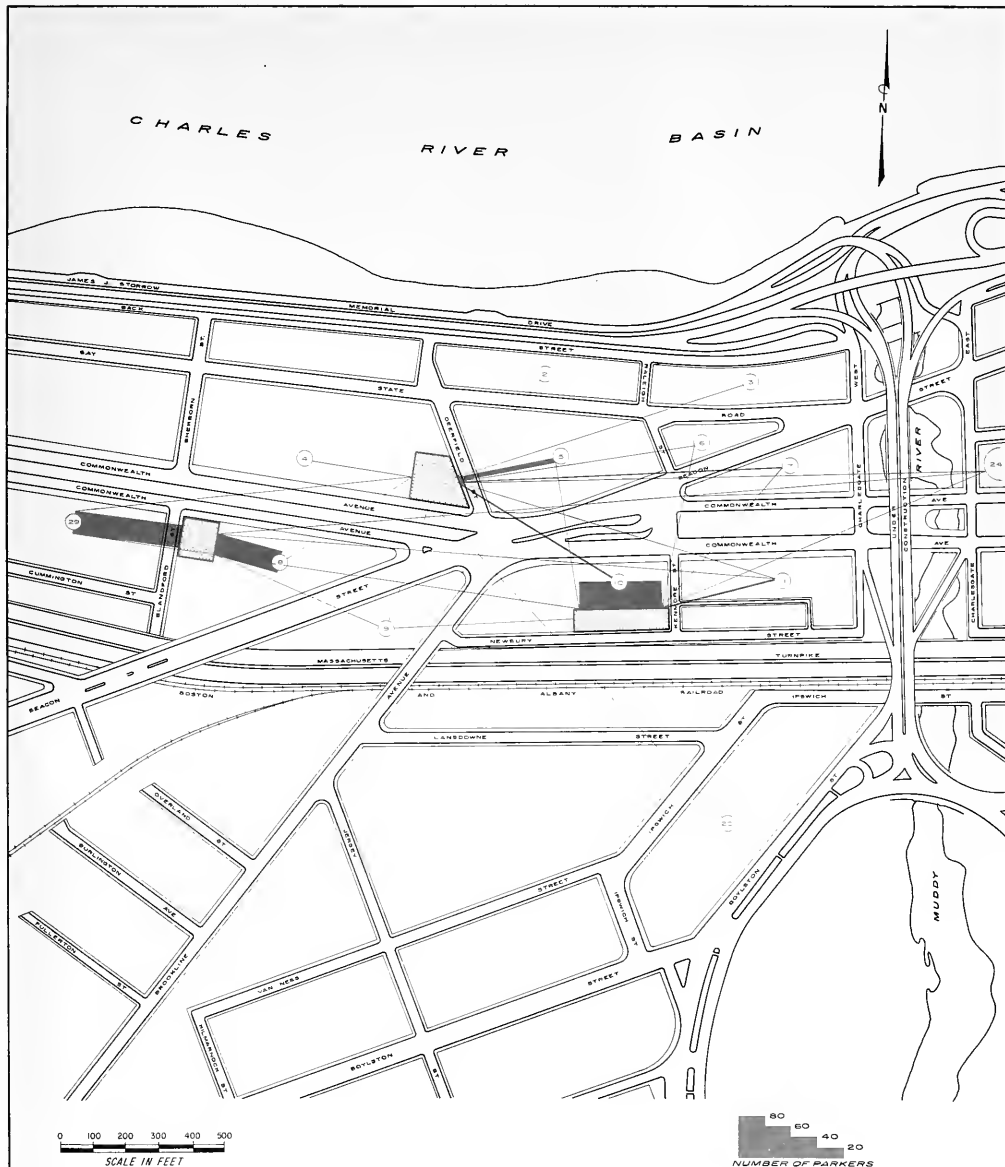
Table 7

PARKER DESTINATIONS

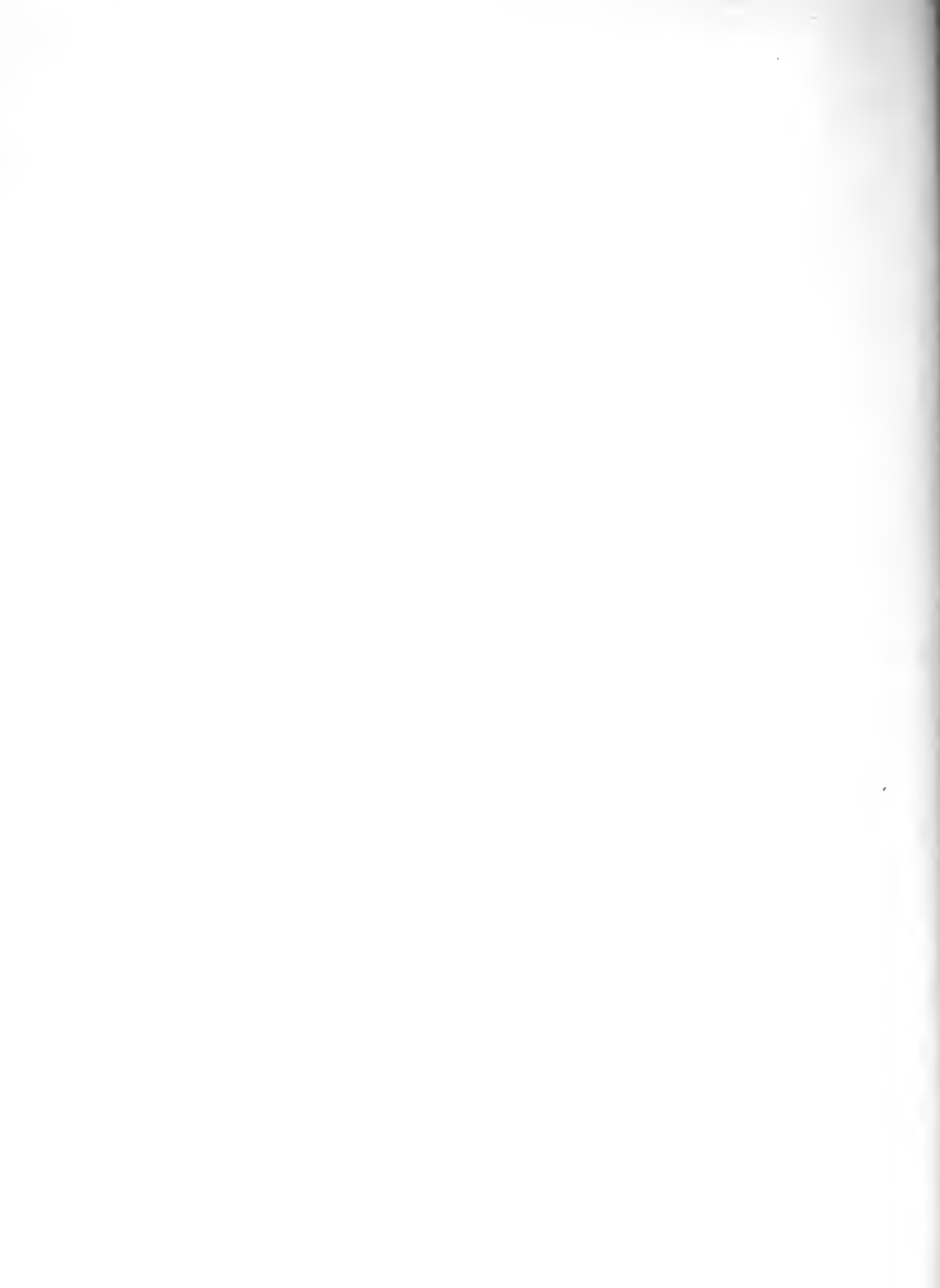
BLOCK NUMBER (1)	NUMBER OF PARKERS			Total	PER CENT
	Kenmore Square Auto Park	Commonwealth Parking Lot	Newbury Street Parking Lots		
<u>Inside Study Area</u>					
2	3	-	-	3	0.7
3	6	-	-	6	1.4
4	5	-	-	5	1.2
5	73	-	2	75	17.7
6	6	-	1	7	1.7
7	13	-	1	14	3.3
8	2	40	-	42	9.9
9	4	1	1	6	1.4
10	13	-	156	169	40.0
11	5	2	29	36	8.5
17	2	-	-	2	0.5
Subtotal	132	43	190	365	86.3
<u>Outside Study Area</u>					
	12	44	2	58	13.7
TOTAL	144	87	192	423	100.0

(1) See Figure 8





STUDY — AREA DESTINATIONS SELECTED OFF-STREET FACILITIES



adjacent blocks. Only about 12 per cent were destined to blocks beyond those adjacent to the block in which the parking facility is located. This pattern indicates localization of parking demands, and barrier effects of streets and railroads in the area.

Analyses of these data clearly establish that the Massachusetts Turnpike Extension and adjacent railroad effectively divide the study area into two distinct sectors. Virtually no parkers cross these barriers while walking from their parked cars to study-area destinations. This strongly suggests that the proposed garage must have adequate access to Lansdowne Street, if it is to effectively serve areas south of the railroad.

Parking Deficiencies

Parking deficiencies or surpluses within the study area are listed in Table 8 and illustrated in Figure 9, on a block-by-block basis. Parking demands were derived by analysis of estimated parker destinations within the area. Effective parking supply was developed from actual legal parking spaces, adjusted to reflect poorly parked vehicles and spaces lost through parking and unparking during periods of peak parking demands.



Table 3

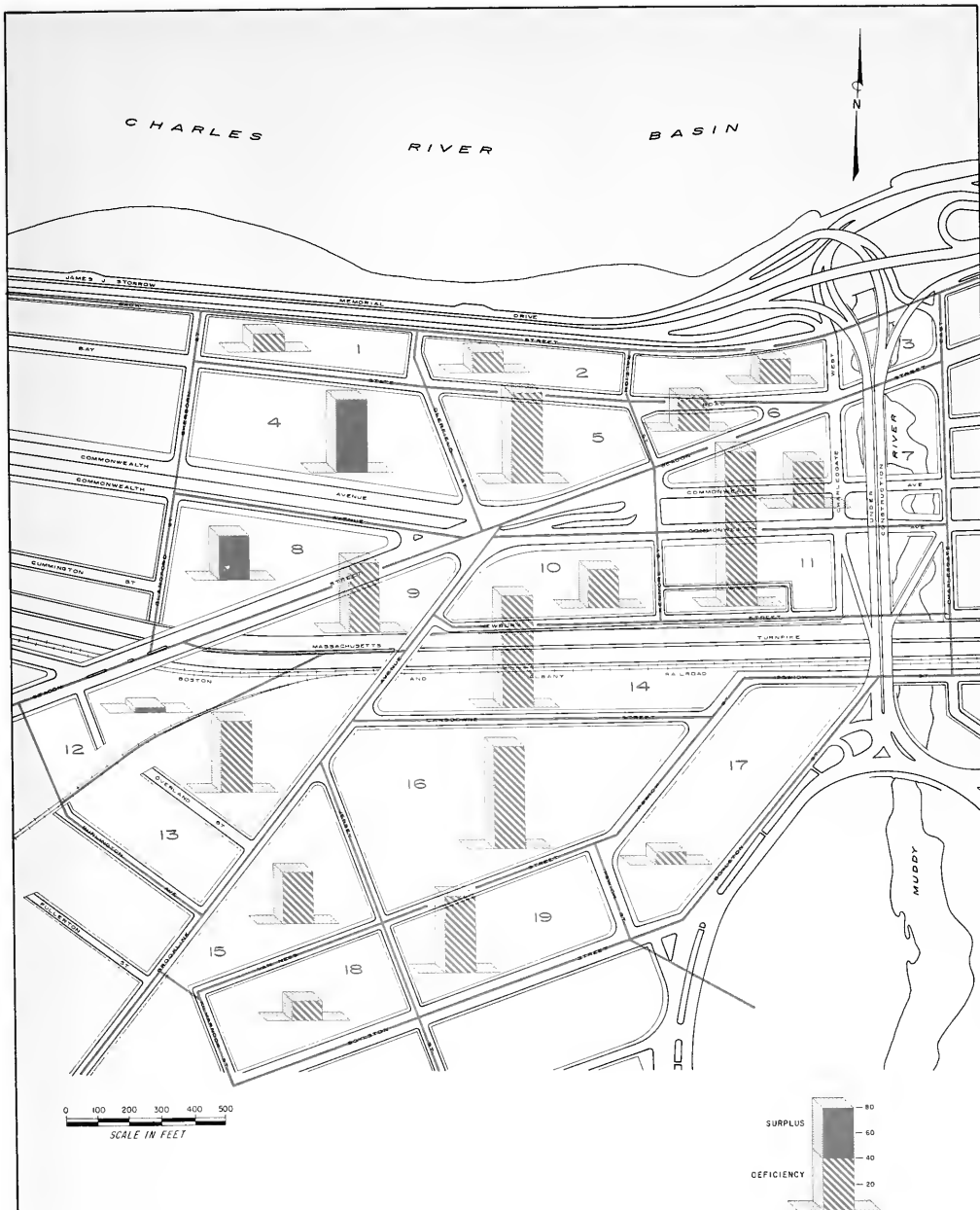
ESTIMATED PARKING DEFICIENCIES
Typical Weekday

		NUMBER	OF	SPACES	
BLOCK	Estimated	Effective			
NUMBER (1)	Parking	Parking			
	Demand	Supply	Surplus	Deficiency	
<u>North of Massachusetts Turnpike</u>					
1	49	35	--	14	
2	59	43	--	16	
3	42	23	--	19	
4	364	421	57	--	
5	136	67	--	69	
6	56	28	--	28	
7	64	28	--	36	
8	133	168	35	--	
9	65	11	--	54	
10 (2)	204	174	--	30	
11	183	63	--	120	
Subtotal	1,355	1,061	92	386	
Net Deficiency =			294 Spaces		
<u>South of Massachusetts Turnpike</u>					
12	101	105	4	--	
13	385	329	--	56	
14	141	53	--	88	
15	234	193	--	41	
16	145	66	--	79	
17	153	143	--	10	
18	159	144	--	15	
19	265	203	--	62	
Subtotal	1,583	1,236	4	351	
Net Deficiency =			347 Spaces		
TOTAL	2,938	2,297	96	737	
Over-All Need =			641 Spaces		

(1) See Figure 9.

(2) Construction of the proposed garage will eliminate 130 off-street spaces presently in use in Block 10, which are included above in "Effective Parking Supply."





ESTIMATED PARKING DEFICIENCIES



On a typical weekday, there is an over-all need of 641 additional parking spaces within the study area, before consideration of the 130 parking spaces to be eliminated by construction of the proposed garage. There is a net parking deficiency of 294 spaces north of the Massachusetts Turnpike Extension and 347 spaces south thereof.

Areas of some of the highest parking deficiencies, over 360 spaces within Blocks 5, 9, 10, 11, and 14, are found in close proximity to the site of the proposed garage.

The proposed garage will contain 740 unrestricted spaces and, allowing for the 130 spaces to be eliminated by its construction, will produce a net increase of about 610 spaces within the study area, sufficient to overcome most of the area's present parking deficiencies.

Ball-Game Parking Requirements

The foregoing deficiency data relate to parking requirements on a typical weekday. In addition thereto, consideration was given to parking demands generated by baseball and football games at Fenway Park, adjacent to the site of the proposed garage.



Daily attendance figures were obtained from Fenway Park, which are summarized in Tables 9 and 10. These, in turn, were converted to total parking requirements, using travel-mode distribution and automobile-occupancy rates developed by the Boston Redevelopment Authority in studies of 1962 Fenway Park operations. For typical ball-game events, including both baseball and football, Fenway Park generates average parking demands estimated at 4,600 spaces, based upon 1963-1964 attendance. Subsequent presentations will show that approximately 10 per cent of these minimum parking requirements have been assigned to the proposed garage.

Table 9

FOOTBALL-GAME ATTENDANCE AT FENWAY PARK
October 11 to December 1, 1963

<u>DAY OF THE WEEK</u>	<u>TOTAL ATTENDANCE</u>	<u>NUMBER OF GAMES</u>	<u>ATTENDANCE PER GAME</u>
AFTERNOON GAMES:			
Sunday	62,700	3	20,900
EVENING GAMES:			
Friday	83,200	3	27,700
TOTAL - ALL GAMES	<u>145,900</u>	<u>6</u>	<u>24,300</u>

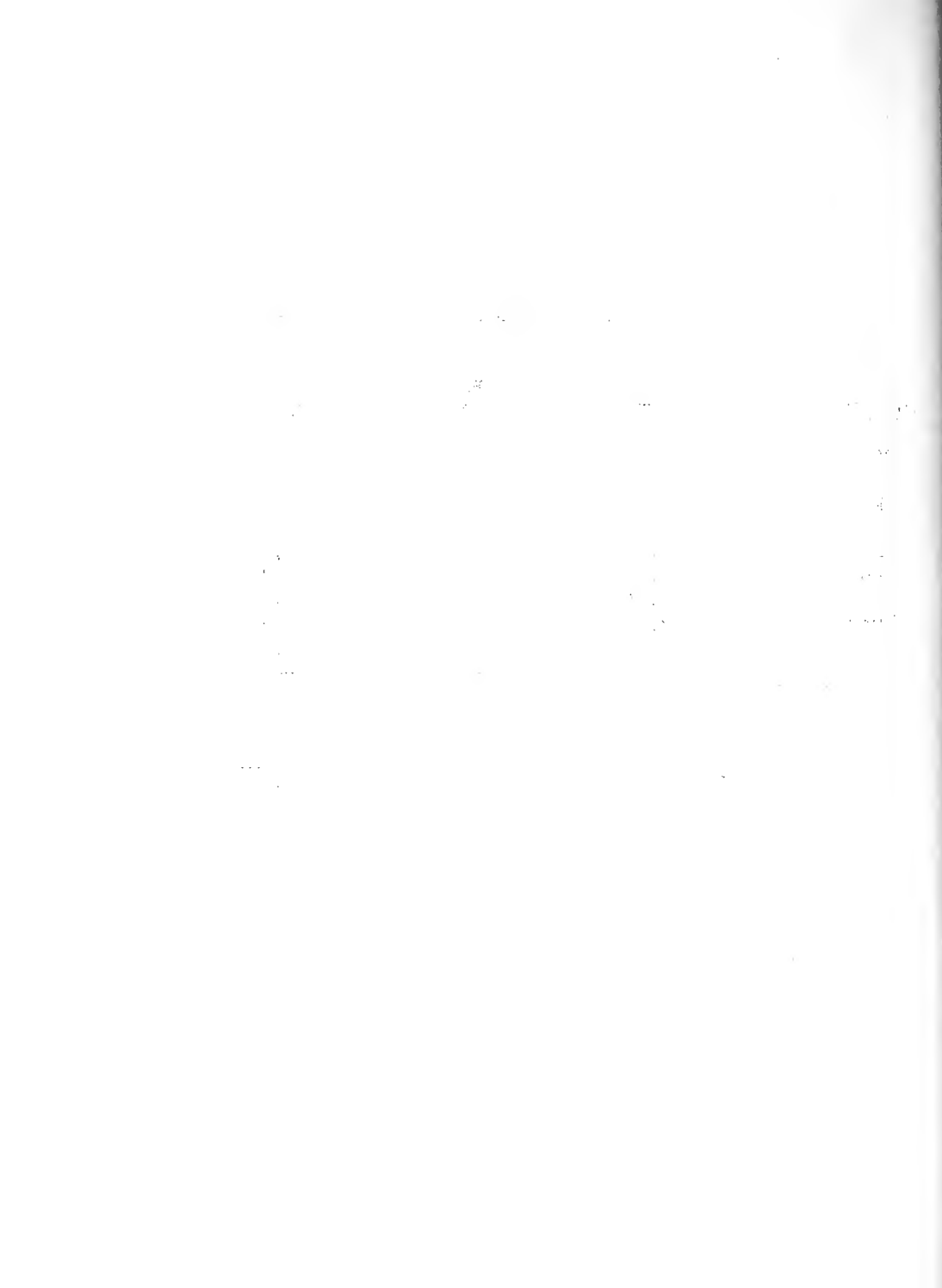
Table 10

BASEBALL-GAME ATTENDANCE AT FENWAY PARK
April 17 to October 4, 1964

<u>DAY OF THE WEEK</u>	<u>TOTAL ATTENDANCE</u>	<u>NUMBER OF GAMES</u> (1)	<u>ATTENDANCE PER GAME</u>
AFTERNOON GAMES:			
Weekdays -			
Monday	15,500	1	15,500
Tuesday	9,200	3	3,100
Wednesday	17,000	5	3,400
Thursday	42,900	7	6,100
Friday	20,200	1	20,200 (2)
Subtotal	104,800	17	6,200
Saturday	92,100	13	7,100
Sunday	209,000	13	16,100
TOTAL - AFTERNOON	405,900	43	9,400
EVENING GAMES:			
Weekdays -			
Monday	66,800	5	13,400
Tuesday	102,600	8	12,800
Wednesday	107,400	7	15,300
Thursday	28,300	1	28,300
Friday	151,800	10	15,200
Subtotal	456,900	31	14,700
Saturday	20,000	1	20,000
Sunday	--	--	--
TOTAL - EVENING	476,900	32	14,900
TOTAL - ALL GAMES	882,800	75	11,800

(1) Includes five Sunday and one Wednesday afternoon "Double-headers" as single games.

(2) Friday, April 17, 1964 - Opening Day.



Chapter 3

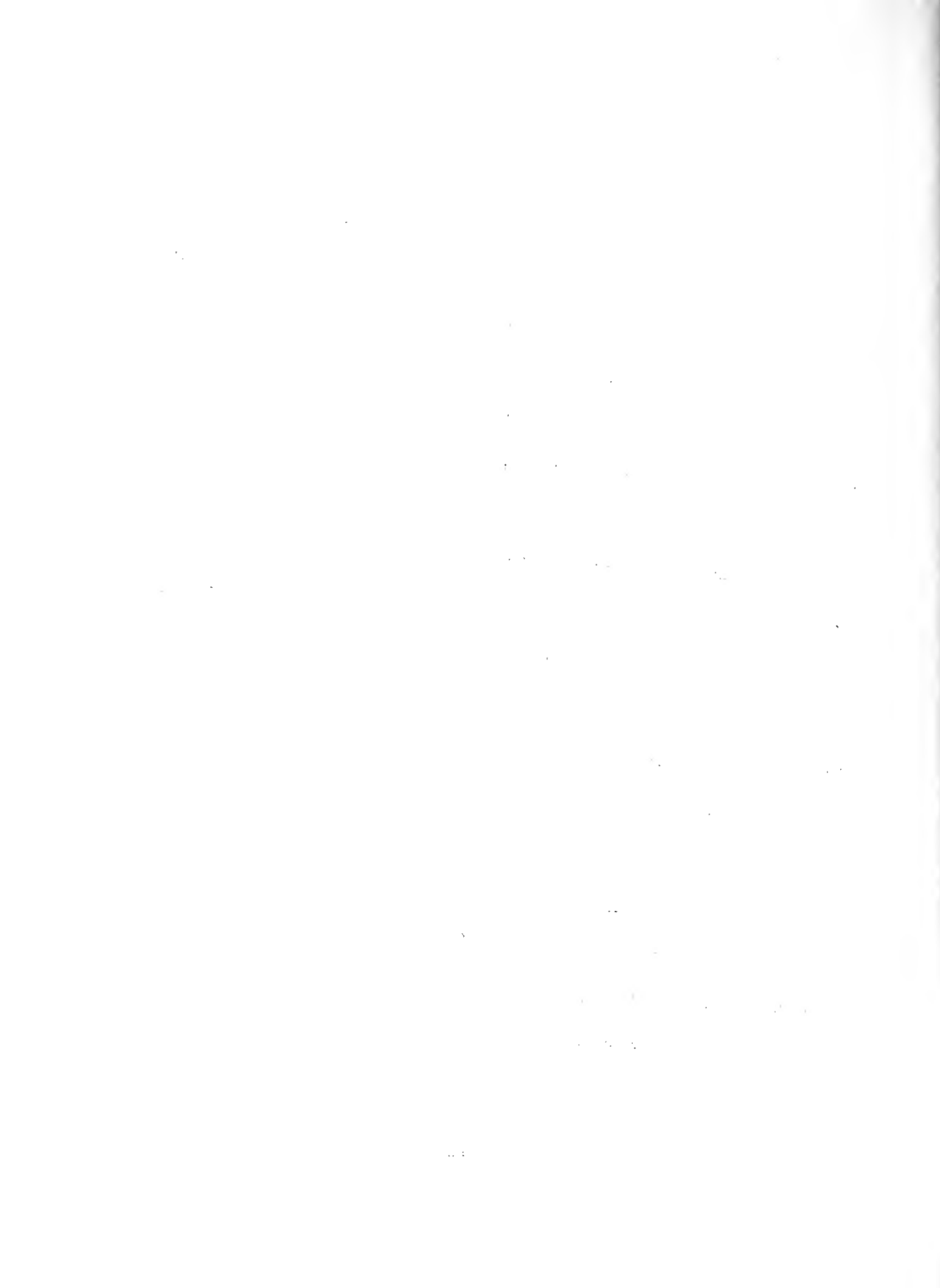
TRAFFIC CONDITIONS AND GARAGE ACCESSIBILITY

An important element in the proposed garage's value to the motoring public and, ultimately, its financial success, is its accessibility, which may be determined by evaluations of the surrounding street system, the garage's entrance and exit features, and existing traffic conditions within the site's environs. These aspects are discussed in this chapter.

To assist in these evaluations, traffic information recently gathered in other studies within the area was reviewed, supplemented by special vehicle counts conducted on typical weekdays at critical intersections near the garage site. Preliminary plans for the proposed garage's entrance and exit ramps, internal circulation, and pedestrian-handling facilities were also evaluated.

Regional Accessibility

As indicated in Figure 1 (Chapter 1), the site of the proposed garage has good regional accessibility. Many high-type roadways converge in the Kenmore Square area and the



location is not far from exit and entrance ramps to the Massachusetts Turnpike Extension, to and from the west.

Potential garage patrons entering the Kenmore Square area from the west via the Turnpike may use Allston Interchange 18, approximately two miles west of the site. From this point, they can approach the garage via Storrow Drive, a controlled-access expressway with a 40 M.P.H. speed limit.

Garage patrons returning to the west, via the Turnpike, may take Storrow Drive westward about two miles and enter the Turnpike at Interchange 18. Another, somewhat less convenient, approach to the westbound Turnpike may also be used - traveling eastward from the garage area to Massachusetts Avenue, thence to Turnpike Interchange 19.

Because of its toll features, there are no Turnpike exits or entrances which would permit use of the Turnpike by potential garage patrons to and from the east. However, other major roadways provide adequate accessibility to the garage site area from the east.

Major-Street Traffic Volumes

Major arterial streets serving the study area carry relatively high weekday traffic volumes, as indicated in Table 11. These data were developed prior to disruption of

Table 11

TRAFFIC VOLUMES ON MAJOR STREETS
Proposed Site Environs

<u>MAJOR STREET</u>	<u>AREA</u>	<u>AVERAGE WEEKDAY TRAFFIC</u> (1)
Commonwealth Ave.	West of Kenmore Square	21,000
Beacon Street	West of Kenmore Square	17,600
Brookline Ave.	West of Kenmore Square	12,000
Commonwealth Ave.) Beacon Street)	East of Kenmore Square	45,000
Boylston Street	West of Fens	23,100
Boylston Street	At the Fens	30,000
Charlesgate	East and West	35,000
Storrow Drive	West of Charlesgate	60,000
Storrow Drive	East of Charlesgate	75,000

(1) Prior to opening of the Massachusetts Turnpike Extension.

Source: Renewal Program Traffic Study, prepared for the Boston Redevelopment Authority by Wilbur Smith and Associates, dated January, 1965.



traffic patterns due to construction of bridges over the Massachusetts Turnpike Extension, which bisects the study area just south of, and generally parallel to, Commonwealth Avenue.

Storrow Drive, along the northern boundary of the study area, has the highest traffic volumes, ranging from 60,000 vehicles per weekday west of Charlesgate, to 75,000 east thereof.

Boylston Street, at the southern boundary of the study area, carries weekday traffic volumes of over 23,000 vehicles west of the Fens, while its average weekday traffic at the Fens reaches 30,000.

Along the eastern boundary of the study area, Charlesgate East and Charlesgate West have combined traffic volumes of 35,000 vehicles per weekday.

West of Kenmore Square, Commonwealth Avenue has an average weekday traffic volume of 21,000 vehicles, while Beacon Street and Brookline Avenue carry volumes of 17,600 and 12,000 respectively.

East of Kenmore Square, Commonwealth Avenue and Beacon Street serve combined traffic volumes of 45,000 vehicles per weekday.

The foregoing traffic volumes indicate an arterial street network operating at or near practical capacity. Congestion frequently occurs during peak hours, sometimes aggravated by illegally parked vehicles in certain areas.

The recent opening of the Massachusetts Turnpike Extension has had beneficial impacts upon arterial streets in Kenmore Square. Significant diversion to the Turnpike of so-called "through" traffic has occurred from Storrow Drive, Commonwealth Avenue, and to a lesser extent, Beacon Street and Brookline Avenue. This diversion, together with recent reconstruction of the Charlesgate overpass, has provided added street capacity for local traffic movements and made the proposed garage site more readily accessible.

Local-Access Streets

The proposed garage would have vehicular and pedestrian access to three local roadways, Kenmore, Newbury, and Lansdowne Streets. Each of these were evaluated with respect to their present traffic volumes and the impact of garage access. With the possible exception of the intersection of Brookline Avenue and Newbury Street, which may require police traffic direction after ball games and on occasional afternoon peak hours, the local street system can readily

1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt$$

and to the study of the function $F(x)$ defined by the equation

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$$I(x) = \int_0^x \frac{1}{1+t^2} dt$$

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4. The second part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt$$

and to the study of the function $F(x)$ defined by the equation

$$F(x) = \int_0^x \frac{1}{1+t^2} dt$$

5.

accomodate garage traffic volumes superimposed on present usage.

Kenmore Street - This roadway is about 26 feet wide and is presently one-way, northbound, from Newbury Street to Commonwealth Avenue. Much of its curb space is utilized as a taxi-stand, in conjunction with the Kenmore Hotel, one of the largest parking generators in the site area. During the morning peak hour, weekday traffic volumes amount to less than 50 vehicles.

It is essential that the traffic direction on Kenmore Street be reversed, that is, made one-way southbound, thereby providing direct access to the proposed garage from Commonwealth Avenue. No significant hardship would be imposed on its present users, inasmuch as some circuitous travel is already involved in taxi and other automobile trips to the Kenmore Hotel. Reversing this street would merely cause existing circuitous travel to be shifted from arrival trips to departure trips.

Newbury Street - This roadway is about 29 feet wide and is operated one-way, westbound. The portion of the street serving the garage site extends from Charlesgate West on the east, to Brookline Avenue on the west. Present traffic

volumes are low, with morning peak-hour flows of 80 vehicles east of Kenmore Street and only 35 vehicles west thereof, in the immediate vicinity of the proposed garage.

No change in the operation of Newbury Street would be required by the proposed garage and, with reasonable enforcement of peak-hour parking restrictions, it could adequately serve the proposed garage without difficulty. Congestion may occur immediately after ball games and, occasionally, during regular afternoon peak hours, depending upon the ability of Newbury Street traffic to enter Brookline Avenue.

The intersection of Newbury Street and Brookline Avenue is not signalized. However, sufficient vehicle-storage capacity exists between the proposed garage and this intersection to preclude delays at the intersection from interfering with garage-exiting operations.

Lansdowne Street - This roadway is about 32 feet wide and is currently operated one-way eastbound. It extends from Brookline Avenue on the west to Ipswich Street on the east. Peak-hour traffic volumes approximate 160 vehicles in the morning and 245 vehicles in the afternoon.

No change in the operation of Lansdowne Street would be required by the proposed garage, and it has adequate



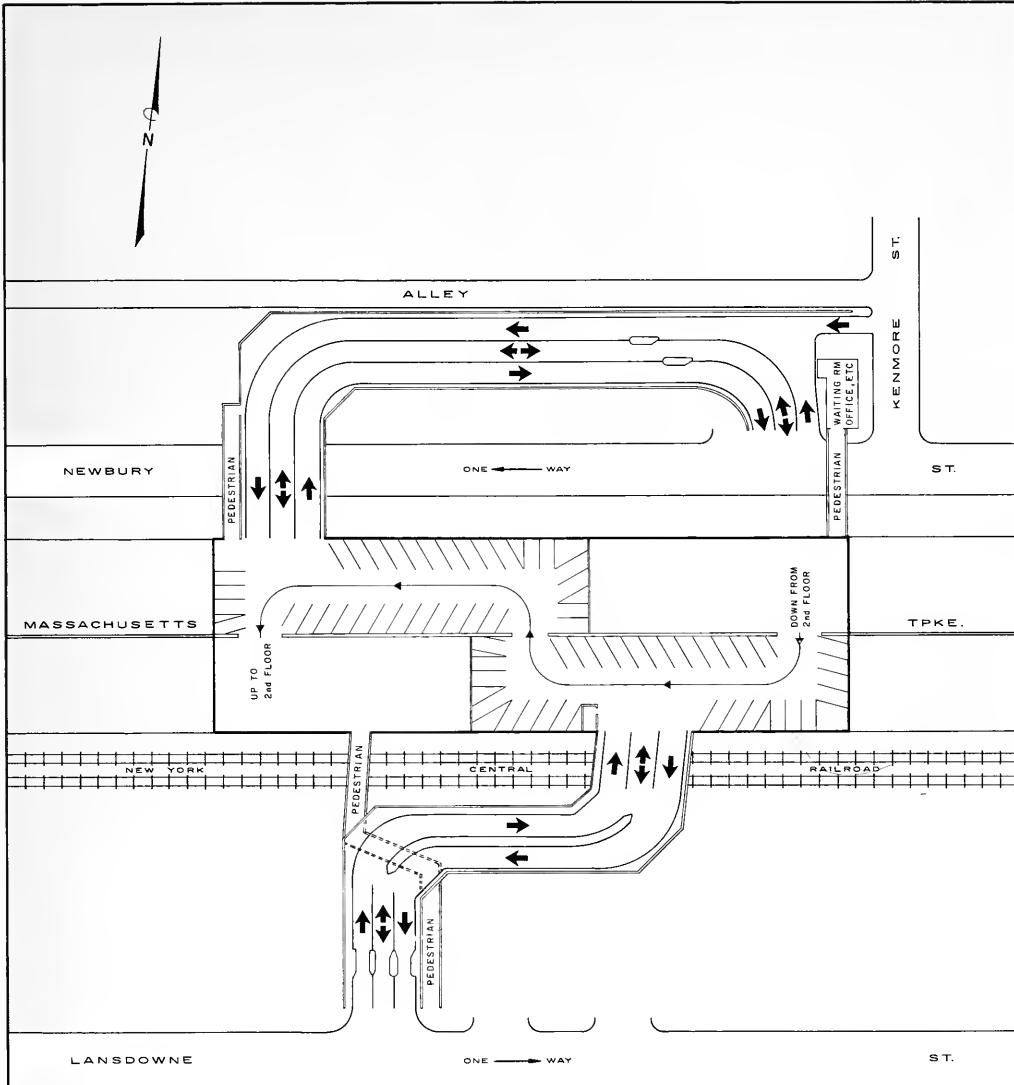
capacity to serve the proposed garage. Again, congestion may occur immediately after ball games, and on a few other occasions, depending upon the ability of Lansdowne Street traffic to enter Ipswich Street.

The intersection of Lansdowne and Ipswich Streets is not signalized but sufficient vehicle-storage capacity exists between the proposed garage and this intersection to preclude delays from interfering with garage-exiting operations. Ipswich Street has weekday afternoon peak-hour traffic volumes of about 600 vehicles, well under practical capacity.

Access and Egress Ramps

The proposed garage would have three entrances and two exits. Access and egress lanes would be provided on Newbury and Lansdowne Streets, and an entrance lane only on Kenmore Street, as shown in Figure 10. Three lanes are proposed at Newbury and Lansdowne Streets, to permit multi-lane access or egress as required.

The ramp facilities contemplated for the proposed garage have more than adequate capacity to handle expected regular patronage. This added capacity provides a reserve for ball-game parking and for potential garage expansion.



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ACCESS FACILITIES

PROPOSED KENMORE SQ. PARKING GARAGE



Kenmore Street - A single entrance lane would be provided on Kenmore Street, just north of Newbury Street. This garage entrance would enable patrons from Commonwealth Avenue to avoid two sharp right turns otherwise necessary to enter on the Newbury Street side. Once inside the garage, traffic entering via Kenmore Street would merge with the right entering lane from Newbury Street.

Newbury Street - Traffic entering or leaving the proposed garage via Newbury Street would utilize ramp facilities located just west of Kenmore Street. Three lanes are provided, with the center lane reversible, that is, available for either peak entering periods or peak exiting periods. The other two lanes would be directionally fixed, one entering and the other exiting. No crossing movements would occur, regardless of the directional use of the center (reversible) lane.

Upon entering the ramp, patrons would automatically receive a time-marked ticket, drive up the ramp and, after a left turn, cross the vehicular bridge over Newbury Street and enter the garage proper.

Lansdowne Street - Ramp facilities at Lansdowne Street are similar in operational technique to the Newbury Street

ramps. However, in this case, the left ramp lane would be for entering traffic and the right ramp lane for exiting traffic (Lansdowne Street being one-way eastbound). The center lane would be reversible. This "English" system is required to avoid crossing movements at Lansdowne Street and has been successfully applied in other garages.

Vehicle Circulation

Within the garage, all vehicle movements are via one-way aisles, with no crossing movements. Two means of reversing vertical direction are available. Motorists may continue driving up to the roof level and return downward on the other set of aisles. A somewhat shorter route would be to use one of several mid-garage cross-overs which permits reversal of direction without driving all the way to the garage roof.

Departing motorists, upon reaching the garage's lowest level, have the option of leaving via Lansdowne Street or Newbury Street, or returning upward into the garage again.

Pedestrian Facilities

Both vertical and horizontal pedestrian movements to, from and within the proposed garage are directly affected by the garage location directly over the Massachusetts Turnpike Extension.

Within the Garage - Vertical pedestrian movements within the garage would be handled by elevators and stairways conveniently situated at three locations, (a) the northeast corner, near Newbury and Kenmore Streets, (b) near the northwest corner, also on the Newbury Street side, and (c) on the south side of the garage, just east of its center. These facilities provide pedestrian access between the garage's lowest floors and roof-level parking areas.

To and From Garage - Between adjacent streets and the garage's lowest floors, patrons may use any of three pedestrian bridges or walkways. On the Newbury Street side, two pedestrian crossings are to be provided. One crosses Newbury Street near Kenmore Street and enters the waiting room-office building. The other Newbury Street pedestrian crossing exits from the garage directly onto the north side of Newbury Street.

On the south side of the garage, a third pedestrian bridge will pass over the New York Central Railroad, thence under the Lansdowne Street vehicle ramp, directly to the north side of Lansdowne Street.

Chapter 4

ECONOMIC ANALYSES

Anticipated patronage of the proposed garage was estimated on the basis of present parking deficiencies within the study area, and parking requirements of events at Fenway Park. Optimum parking rates were developed and applied to anticipated garage usage to produce gross revenues. Estimated operating and maintenance expenses were deducted from gross revenues to produce net operating income, which was, in turn, compared with debt-service requirements of total project costs, to determine over-all financial feasibility.

Recommended Parking Rates

Current parking rates at commercial off-street facilities within the study area were carefully reviewed. In developing optimum rates for the proposed garage, consideration was given to relative proximity to areas of major parking demands, inherent operational economies of a modern multi-level, self-parking facility, and gross revenue requirements. Parking charges developed by these analyses are listed in Table 12.

THEORY

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Table 12

RECOMMENDED PARKING RATES

<u>TYPE PARKING</u>	<u>RECOMMENDED PARKING RATE</u>
<u>Weekdays and Saturdays, 7:00 A.M. to 6:00 P.M.</u>	
First Half Hour	\$0.25
Second Half Hour	0.25
Each Hour Thereafter	0.25
Maximum Charge (over four hours)	1.50
<u>Evening Parking, 6:00 P.M. to 1:00 A.M. (1)</u>	
First Hour	\$0.50
Each Hour Thereafter	0.25
Maximum Charge (over four hours)	1.50
<u>Monthly Parking</u>	
Weekdays only, 7:00 A.M. to 6:00 P.M.	\$20.00
<u>Ball Games</u>	
Sundays - Single Games	\$1.50
"Doubleheader" Events	2.00
All Other Games - Regular Rates (2)	1.25

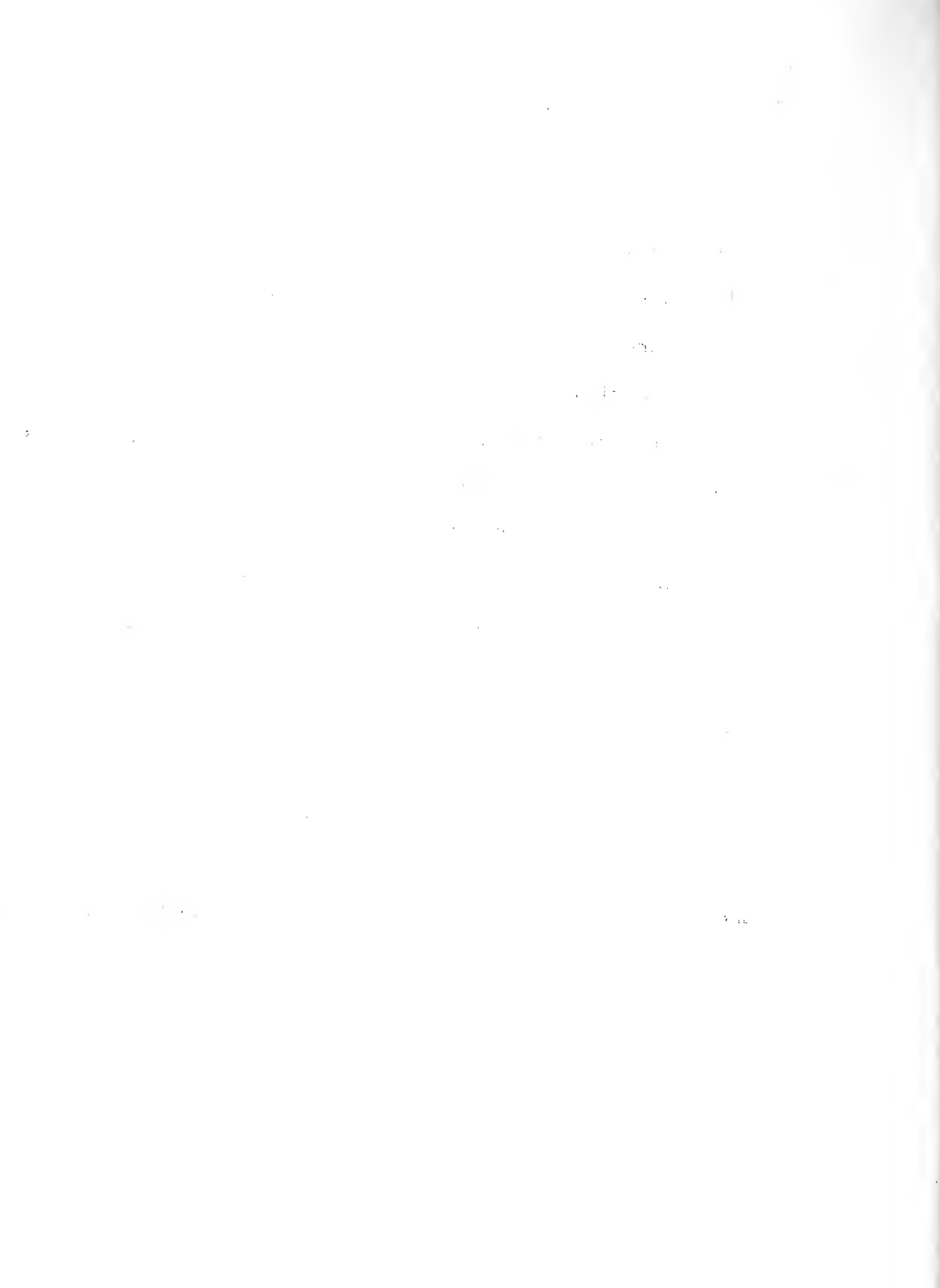
(1) 2:00 A.M. on Friday and Saturday evenings.

(2) Ball-game parking would range from 2.5 to four hours,
with an estimated average charge of \$1.25.

Charges for the first hour would be \$0.50, with a day-time option (7:00 A.M. to 6:00 P.M.) of parking 30 minutes or less for \$0.25. Charges for the second and subsequent hours would be \$0.25, with a daytime maximum charge of \$1.50. At 6:00 P.M., a "break" would occur in parking charges, starting again at \$0.50 for the first hour and \$0.25 for each additional hour, with an evening maximum charge of \$1.50. To park 24 hours, therefore, would cost at least \$3.00. Monthly parking would be \$20.00, applicable only to daytime, weekday parking between 7:00 A.M. and 6:00 P.M.

The "mixing" of ball-game and regular patrons on week-day afternoons, evenings, and Saturdays, generally precludes special ball-game parking rates, without a cumbersome variety of parking charges differing by parking purpose. Since the typical ball game lasts between 2.5 and four hours, related charges would range from \$1.00 to \$1.50, averaging \$1.25, compared with about \$2.00 for equally convenient ball-game parking.

Since the proposed garage would not be opened on Sundays, except for ball-game events, mixing of ball-game and regular patrons would not occur and a special rate of \$1.50 for single games and \$2.00 for "doubleheader" events could be effectively



applied. This would produce an average charge of \$1.65 for ball-game parking on Sundays.

Basic Assumptions

Estimated revenues and usage of the proposed garage were based upon the following conditions:

1. The proposed garage would be constructed essentially as indicated by the architect-engineer, with adequate access and exit points on both Newbury and Lansdowne Streets, and an access point on Kenmore Street.
2. The proposed garage would have a parking capacity of approximately 740 vehicles.
3. The proposed garage would be open to the public between the hours of 7:00 A.M. and 1:00 A.M., Mondays through Thursdays, 7:00 A.M. to 2:00 A.M., Fridays and Saturdays, and on Sundays when ball games are played at Fenway Park.
4. Parking rates at the proposed garage would be essentially as recommended in this report.
5. The proposed garage would be efficiently operated, adequately maintained, and effectively signed and promoted, so as to attract all types of patrons.



6. Fenway Park would continue to hold baseball and football games with 1963-1964 frequency.
7. Parking meters would be replaced on adjacent and nearby streets, to an extent comparable to that which existed prior to their recent removal.
8. No national or local emergency will arise which would restrict the use of private motor vehicles.

Any significant departure from these conditions could materially affect usage and revenues.

First-Year Parking Revenues

Anticipated gross revenues of the proposed garage were developed by analysis of parking demands and deficiencies throughout the study area, parking requirements of events at Fenway Park, and proposed garage capacity, using the recommended parking rates previously described.

Details of estimated first-year patronage and related parking revenues are shown in Table 13. Approximately 249,000 parkers are expected to use the facility during its first full year of operation, producing revenues of \$270,900, an average of 774 parkers and \$841 per day. The over-all average charge would be \$1.09.



Table 13

FIRST-YEAR PARKING REVENUES

TYPE PARKING	AVERAGE PARKERS PER DAY	NUMBER OF DAYS	ESTIMATED AVERAGE CHARGES	ANNUAL ESTIMATE	
				Number of Parkers	Parking Revenues
<u>Weekdays (7:00 A.M. to 6:00 P.M.)</u>					
Hourly	330	254	\$0.67	83,800	\$ 56,100
All Day Maximum	165	254	1.50	41,900	62,900
Monthly	85	254	0.94	21,600	20,400
Ball Game	270	17	<u>1.25</u>	<u>4,600</u>	<u>5,700</u>
Subtotal			\$0.96	151,900	\$145,100
<u>Saturdays (7:00 A.M. to 6:00 P.M.)</u>					
Hourly	200	52	\$0.77	10,400	\$ 8,000
All Day Maximum	115	52	1.50	6,000	9,000
Ball Game	350	14	<u>1.25</u>	<u>4,900</u>	<u>6,100</u>
Subtotal			\$1.08	21,300	\$ 23,100
<u>Weekday and Saturday Evenings (6:00 to 1:00-2:00 A.M.)</u>					
Hourly	40	306	\$0.77	12,200	\$ 9,400
All Night Maximum	120	306	1.50	36,700	55,100
Ball Game	475	34	<u>1.25</u>	<u>16,200</u>	<u>20,200</u>
Subtotal			\$1.30	65,100	\$ 84,700
<u>Sundays</u>					
Ball Games Only	675	16	\$1.65	10,900	\$ 18,000
ESTIMATED ANNUAL TOTAL				<u>249,200</u>	<u>\$270,900</u>
AVERAGES PER DAY (322 days)				774	\$ 841



About 20 per cent of these revenues - \$50,000 per year - would be related to ball-game patronage. The largest portion would be obtained from evening games, \$20,200, with Sunday events next in importance at \$18,000.

Projected Gross Revenues

Allowances were made for anticipated rental income of unused space under or adjacent to the proposed garage's ramps on Newbury and Lansdowne Streets, and conservative growth factors were selectively applied to initial revenue estimates to project gross earnings for succeeding years.

Estimated gross revenues for the proposed garage during its first ten years of operation, 1967 through 1976, are listed in Table 14. Revenues from regular parking patrons are expected to increase about one-third during this ten-year period, from \$220,900 in 1967 to \$293,300 in 1976 and subsequent years. Parking revenues from ball-game patrons were not increased beyond first-year estimates of \$50,000. In the interests of conservatism, no revenue growth beyond 1976 has been indicated.

In addition to the foregoing parking revenues, the proposed garage is expected to produce rental income related to otherwise unused space near the Newbury and Lansdowne



Table 14

PROJECTED ANNUAL REVENUES

YEAR OF OPERATION	REGULAR PARKING		BALL-GAME AND OTHER REVENUES (1)	TOTAL GROSS REVENUES	
	Per Cent Increase	Gross Revenues		Per Cent Increase	Amount
1967	--	\$220,900	\$50,000	--	\$270,900
1968	5.0	231,900	50,000	4.1	281,900
1969	5.0	243,500	59,000	7.3	302,500
1970	4.0	253,200	59,000	3.2	312,200
1971	4.0	263,300	70,000	6.8	333,300
1972	3.0	271,100	70,000	2.3	341,100
1973	3.0	279,200	70,000	2.3	349,200
1974	2.0	284,800	70,000	1.6	354,800
1975	2.0	290,500	70,000	1.6	360,500
1976	1.0	293,300	70,000	0.8	363,300
After 1976	--	293,300	70,000	--	363,300

AVERAGE GROSS REVENUES PER YEAR:

First Five Years	\$300,200
First Ten Years	\$327,000
19-Year Earning Period	\$344,200

(1) Includes \$50,000 for ball-game patron parking, \$11,000 rental for the Lansdowne Street land parcel not required by garage ramps, and \$9,000 rental for land under the Newbury Street ramp.



Street ramps. However, it may take several years to realize this added income.

At Newbury Street, there are approximately 60 parking spaces available, which cannot be economically controlled by routine garage operations. Accordingly, it appears desirable to lease this space in its entirety to a single tenant, for about \$9,000 per year, in line with similar arrangements frequently found throughout the study area. Presumably, the tenant would be prohibited from conducting competing commercial off-street parking activities, thereby protecting revenues of the garage. Leasing of space near the Newbury Street ramp is expected to occur at about the third year of garage operations, 1969.

At Lansdowne Street, comparable rent income of about \$11,000 annually may be realized from an area equal to about 55 parking spaces. At this location, a distinct possibility exists of construction over the garage ramp, with potential long-term, air-right or ground-rent, income. Such income is expected to be realized at about the fifth year of garage operations, 1971.

Gross revenues for the proposed garage, including both parking income and anticipated rentals, are expected to increase



from \$270,900 during the first year, 1967, to \$363,300 in 1976 and subsequent years. During the first five years of operation, gross revenues from all sources are estimated at \$300,200 per year, increasing to \$327,000 per year over the first ten years. For the entire 19-year earning period of a 20-year bond issue, total gross revenues are expected to average \$344,200 per year.

Maintenance and Operating Costs

Annual maintenance and operating costs of the proposed garage are shown in Table 15. First-year estimates were increased two per cent annually, to reflect wage increases and inflation. No provision has been made for property taxes or facility depreciation.

Personnel Requirements - The proposed garage would require a minimum of six employee positions, in order to satisfactorily serve the motoring public. These would consist of (a) a salaried garage supervisor, (b) four cashiers, and (c) one maintenance employee.

At each of two exit points, Newbury Street and Lansdowne Street, one cashier would be on duty from 7:00 A.M. until 5:00 P.M. Another cashier would be on duty from 4:00 P.M. until closing at 1:00 or 2:00 A.M. During periods of peak

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Table 15

ANNUAL MAINTENANCE AND OPERATING COSTS

<u>YEAR OF OPERATION</u>	<u>ITEM</u>	<u>ANNUAL ESTIMATE</u> (1)
1967	<u>Personnel Costs</u>	
	Direct Labor for Six Positions	\$31,700
	Various Fringe Benefit Costs	6,300
	<u>Maintenance Costs</u>	
	Building, Ramps, etc.	1,400
	Equipment, etc.	3,500
	Snow Removal	3,000
	<u>Other Expenses</u>	
	Utilities	8,000
	Supplies	1,600
	Insurance	2,500
	Subtotal	\$58,000
	<u>Administration and Accounting</u>	5,800
	TOTAL-FIRST YEAR	\$63,800
1968	Total Maintenance and Operating Costs	\$65,100
1969	" " " " "	66,400
1970	" " " " "	67,700
1971	" " " " "	69,100
1972	" " " " "	70,400
1973	" " " " "	71,800
1974	" " " " "	73,200
1975	" " " " "	74,700
1976	" " " " "	76,200
After 1976	" " " " "	76,200
AVERAGE MAINTENANCE AND OPERATING COSTS PER YEAR:		
	First Five Years	\$66,400
	First Ten Years	69,800
	19-Year Earning Period	72,900

(1) Excludes property taxes and facility depreciation.

4

1

Protein	Percentage (%)
Actin	~100
GAPDH	~100
GAPDH	~100

2

2

exiting activity, the cashier at each exit would be assisted by either the garage supervisor, or the garage maintenance employee, both of whom would also function as relief cashiers during lunch periods, etc. Thus, two operating exit lanes would be provided during rush hours, at both Newbury Street and Lansdowne Street.

Personnel costs, with fringe benefits, are expected to total \$38,000 for the first year of operation, including over-time and wages for Sunday openings.

Other Expenses - Maintenance costs of the garage structure and utility expenses (water, electricity), were estimated by the architect-engineer at \$1,400 and \$8,000, respectively, for the first year of operation.

Equipment maintenance, primarily pedestrian elevators and ticket-issuing machines, would most probably be handled on a contract basis comparable to that encountered in other parking garages. This item is estimated at \$3,500 for the first year.

An allowance was also made for snow removal, at \$3,000, to insure safe vehicle movement on the Newbury Street and Lansdowne Street ramps, and to permit convenient parking on the garage roof during winter snow conditions.



Garage supplies and liability insurance have been estimated at \$1,600 and \$2,500, respectively, for the first year.

The aforementioned costs, including personnel expenses, are expected to total \$58,000 for the garage's first full year of operation, 1967. To this sum has been added a reasonable allowance (ten per cent) for administration and accounting expenses - \$5,800 - bringing total estimated 1967 maintenance and operating costs to \$63,800.

By 1976, maintenance and operating costs are expected to increase to \$76,200 annually. Over the 19-year earning period of a 20-year bond issue, these costs are estimated to average \$72,900 per year.

Annual Net Operating Income

Estimated net operating income available for debt retirement is presented in Table 16.

The proposed garage is expected to realize net operating income varying from \$207,100 in 1967, its first full year of operation, to \$287,100 in 1976 and subsequent years. Net operating income is expected to average \$233,710 per year during the first five years of operation, increasing to \$257,100 per year during the first ten years. Over the

Table 16

ANNUAL NET OPERATING INCOME

<u>YEAR OF OPERATION</u>	<u>GROSS REVENUES</u> ⁽¹⁾	<u>MAINTENANCE AND OPERATING COSTS</u> ⁽²⁾	<u>ESTIMATED NET OPERAT- ING INCOME</u>
1967	\$270,900	\$63,800	\$207,100
1968	281,900	65,100	216,800
1969	302,500	66,400	236,100
1970	312,200	67,700	244,500
1971	333,300	69,100	264,200
1972	341,100	70,400	270,700
1973	349,200	71,800	277,400
1974	354,800	73,200	281,600
1975	360,500	74,700	285,800
1976	363,300	76,200	287,100
After 1976	363,300	76,200	287,100

AVERAGE NET OPERATING INCOME PER YEAR:

First Five Years	\$233,700
First Ten Years	257,100
19-Year Earning Period	271,300

(1) From Table 14.

(2) From Table 15.

entire 19-year earning period of a 20-year bond issue, net operating income is estimated at \$271,300 annually.

Estimated Project Cost

Capital requirements of the proposed garage are estimated at \$3,335,000, as indicated in Table 17.

Table 17

ESTIMATED PROJECT COSTS

<u>DESCRIPTION</u>	<u>AMOUNT</u>
<u>Development Costs</u> ⁽¹⁾	
Land	\$ 392,000
Demolition of Existing Buildings	50,000
Construction of Proposed Garage	2,236,000
Contingencies	112,000
Architecture and Engineering	236,000
Subtotal	<u>\$3,026,000</u>
<u>Financing and Other Costs</u>	
Legal and Printing Costs	\$ 91,000
Interest during Construction ⁽²⁾	109,000
One-year Interest Reserve ⁽²⁾	109,000
Subtotal	<u>\$ 309,000</u>
TOTAL PROJECT COST	<u>\$3,335,000</u>

(1) Provided by the Architect-Engineer

(2) Approximate, assuming a 3.25 per cent interest rate.

Development costs -- including land acquisition, demolition of existing buildings, garage construction, contingencies, and architecture/engineering costs (provided by the architect-engineer) -- amount to \$3,026,000. Financing, legal and printing expenses, interest during construction, and a reserve of one-year's interest charges are estimated at an additional \$309,000.

Financial Feasibility

To retire a total project cost of \$3,335,000 over 19 years, assuming a 3.25 per cent interest rate, will require annual level debt service payments of approximately \$235,000.

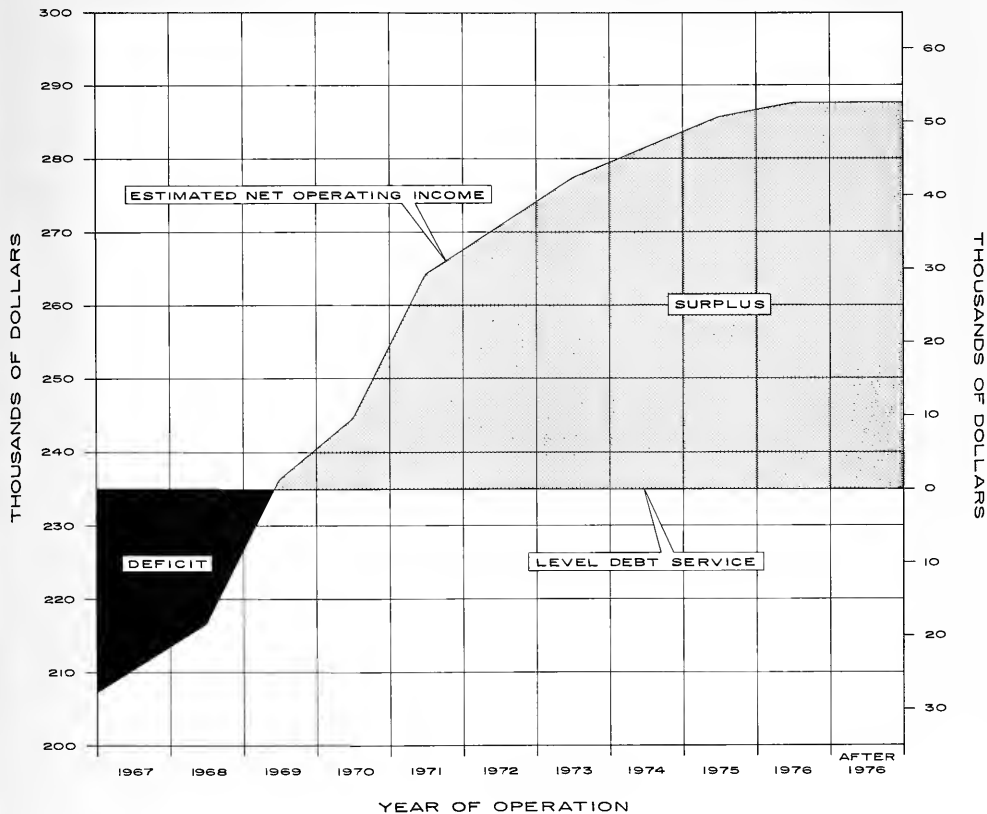
Financial feasibility of this project is summarized in Table 18. For the entire 19-year earning period of the proposed 20-year bond issue, estimated net operating income would provide debt service coverage of 1.15. However, deficits in debt-service totaling \$46,000 will likely occur during the first two years of garage operations, as shown in Figure 11. In the third year, there should be a small surplus of net operating income over debt service and, during the sixth year, debt-service deficits anticipated during the first two years should be eliminated.

Table 18

FINANCIAL FEASIBILITY SUMMARY

<u>DESCRIPTION</u>	<u>AMOUNT</u>
<u>Estimated Project Cost</u>	
Development Costs	\$3,026,000
Financing and Other Costs	309,000
TOTAL	<u>\$3,335,000</u>
<u>Debt-Service Requirements</u>	
Average Per Year for 20-Year Bonds, with 3.25 Per Cent Interest, assuming one year construction period.	\$ 235,000
<u>Estimated Net Operating Income</u>	
First Full Year of Operation	\$ 207,100
Annual Averages - First Five Years	233,700
First Ten Years	257,100
19-Year Earning Period	271,300
<u>Debt-Service Coverage</u>	
First Full Year of Operation	0.83
Annual Averages - First Five Years	0.99
First Ten Years	1.09
19-Year Earning Period	1.15





**ESTIMATED DEBT-SERVICE COVERAGE
PROPOSED KENMORE SQ. PARKING GARAGE**

It may be noted in Table 17, "Estimated Project Costs," that no specific provision has been made for additional borrowing to cover debt service deficits during the first two years of operation. However, the one-year interest reserve included in project costs is more than adequate to service this anticipated deficiency. An alternative would be to reduce principal-retirement payments during the early years of operation, thereby eliminating deficits indicated under level debt service payments.

Conclusions

Additional off-street parking is needed in the vicinity of Kenmore Square. The proposed garage is well located to serve the motoring public, consistent with minimum land taking, and will make a significant contribution to the economic growth of the area.

The proposed garage has adequate entrance and exit capacity, with prudent provisions for future expansion. No major traffic problems are expected on bordering streets. While some congestion will most likely occur at the intersection of Newbury Street and Brookline Avenue (after ball-games and on occasional afternoon rush hours), use of the proposed garage, in lieu of curb parking, should ease current

traffic congestion in the garage area.

Estimated patronage and related net revenues of the proposed garage are estimated to be adequate to meet debt service requirements, assuming general obligation funds are obtained on a 20-year basis, with a 3.25 per cent annual interest rate.



Smith ~~XXXX~~ ^{568P} Fenway

Proposed Kenmore Square Parking
Garage 1965.

C.1

ILBUR SMITH

AND ASSOCIATES



